August, 1949

THE FOUNDRY

wherever metals are cast...

August is the month to

...RELAX...HAVE FUN!

Yes — you can really take things easy when you employ Milwaukee machines in your foundry. These dependable machines . . . designed and built by practical seasoned foundrymen . . . speed up your foundry jobs, enable you to get away for those delightful Summer Vacation days.

Look to MILWAUKEE

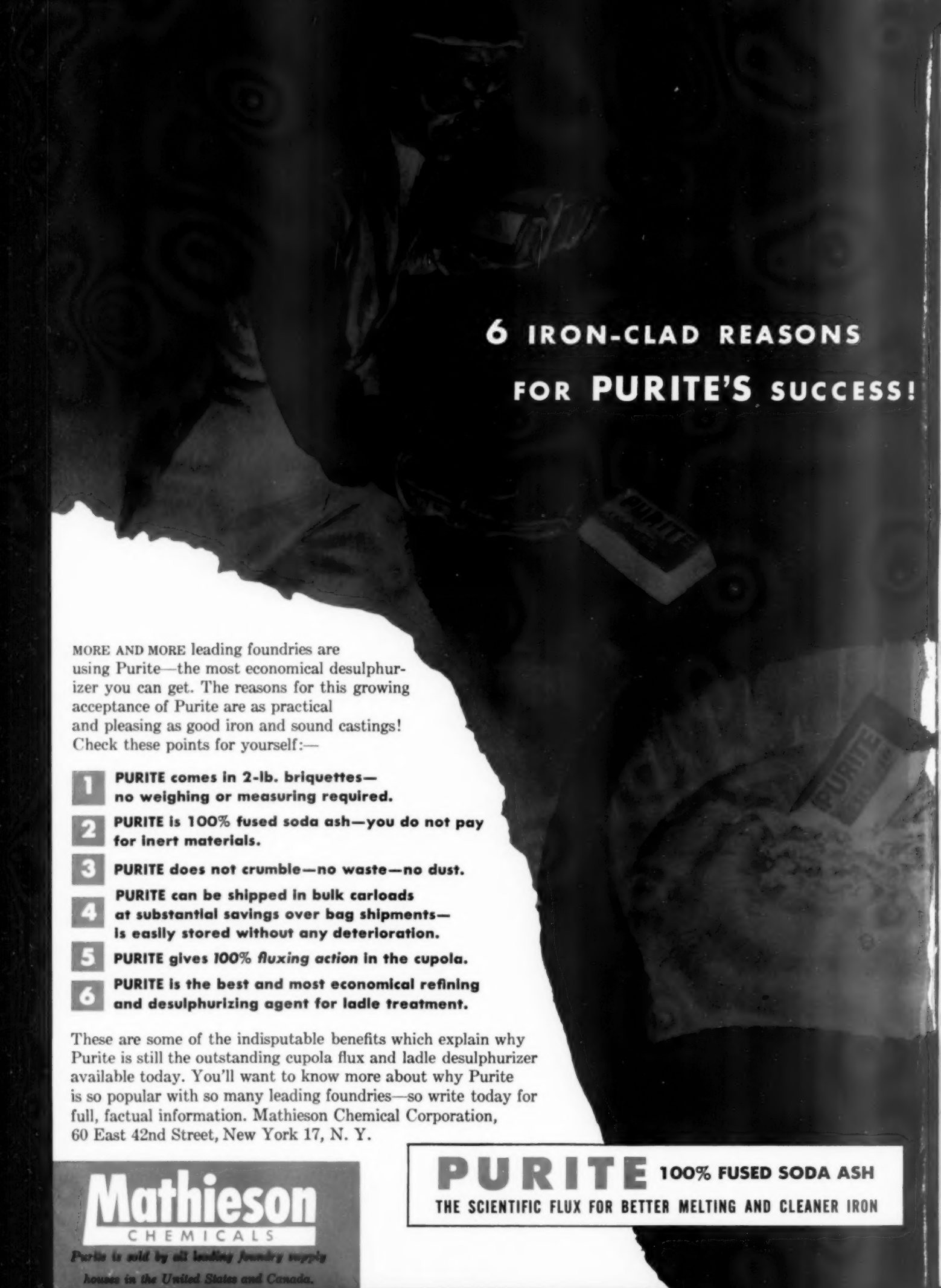
for better Molding Machines, Core Grinders, Core Blowers and Briquetting Presses. Let them work for you while you play. Pay for the machines out of profits.

Look to WISCONSIN

for the ideal vacation spot. It's the playground of America. Cruise on one of its thousands of lakes . . . Swim in cool, refreshing waters . . . Cast for muskies . . . Relax . . . Have fun!

MILWAUKEE *Foundry Equipment Co.*

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.



6 IRON-CLAD REASONS FOR PURITE'S SUCCESS!

MORE AND MORE leading foundries are using Purite—the most economical desulphurizer you can get. The reasons for this growing acceptance of Purite are as practical and pleasing as good iron and sound castings! Check these points for yourself:—

1. **PURITE comes in 2-lb. briquettes—no weighing or measuring required.**
2. **PURITE is 100% fused soda ash—you do not pay for inert materials.**
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5. **PURITE gives 100% *fluxing action* in the cupola.**
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These are some of the indisputable benefits which explain why Purite is still the outstanding cupola flux and ladle desulphurizer available today. You'll want to know more about why Purite is so popular with so many leading foundries—so write today for full, factual information. Mathieson Chemical Corporation, 60 East 42nd Street, New York 17, N. Y.

Mathieson
CHEMICALS

Purite is sold by all leading foundry supply houses in the United States and Canada.

PURITE 100% FUSED SODA ASH
THE SCIENTIFIC FLUX FOR BETTER MELTING AND CLEANER IRON

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DETROIT

SPECIFY THIS POWERFUL, POSITIVE INNOCULANT

NISILOY*

to eliminate hard chilled areas in gray iron castings

. . . REDUCE machining time, tool wear, rejections

Produce *machinable* gray iron castings regardless of sharp variations in section thickness . . .

Eliminate localized hard areas or chilled (white) edges and surfaces . . .

Reduce machining time, tool wear and rejections . . . *raise both quality and quantity of your output by controlling gray iron structure with small ladle additions of NISILOY.*

Designed specifically to promote better machinability, NISILOY is a powerful innoculant and graphitizer containing about 60% Nickel, 30% silicon, balance essentially iron.

Mail the coupon now . . . for your *free* copy of a booklet that describes how Nisiloy helps you improve structure and machinability of gray iron castings.

*Trade Mark of The International Nickel Company, Inc.

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THE INTERNATIONAL NICKEL COMPANY, INC.
Dept. T. F., 67 Wall Street, New York 5, N. Y.

Please send me your booklet entitled,
"NISILOY" for GRAY IRON CASTINGS.

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Company.....

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CROWN HILL SEACOAL FACING

Q. Is there a difference in seacoals?

A. Yes.

Q. What makes the big difference?

A. Quality of the coal, amount of volatile content, plus care in manufacture of the product.

Q. Why do so many foundries use Crown Hill, made by Federal?

A. Crown Hill has quick combustibility, allowing gas and steam to escape fast. This speed of performance results in easy cleaning and helps cut down on defects, another easy way to shave your production costs. Try CROWN HILL SEACOAL FACING—

Popular Choice of Foundrymen Everywhere

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(Moisture Free)

PROXIMATE ANALYSIS

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Ash	3.7%
	100.0%

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Hydrogen	5.4%
Carbon	82.0%
Nitrogen	1.6%
Oxygen	6.6%
Sulphur	.7%
Ash	3.7%
	100.0%

Fusion Point of Ash . . . . 2,980 F.

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AUGUST, 1949

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Illinois

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CLEAN WORKING . . . that's what this coremaker looks for when he fills, tamps, strikes-off, vents, books, draws, and loads on the core rack two cores every 80 seconds! LINOIL cores do not gum-up core boxes; allow clean draws every time.

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GOOD COLLAPSIBILITY . . . after pouring these U.S. "Thin-Tube" radiator sections, metal in some places is only one-tenth of an inch thick! LINOIL cores collapse quickly—avoid cracks and hot tears. Casting rejects are kept to a minimum.

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This New PANGBORN Rotoblast* Room

ONE WORKER *can run this special* ROTOBLAST *Room easily (Harris-Seybold use two to speed up handling outside of Room). Before* ROTOBLAST, *six men working three shifts were required to keep up with the work!*

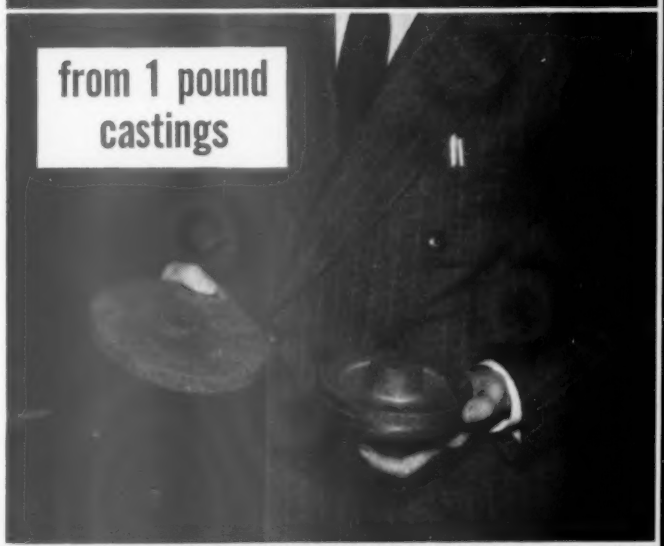
Pangborn

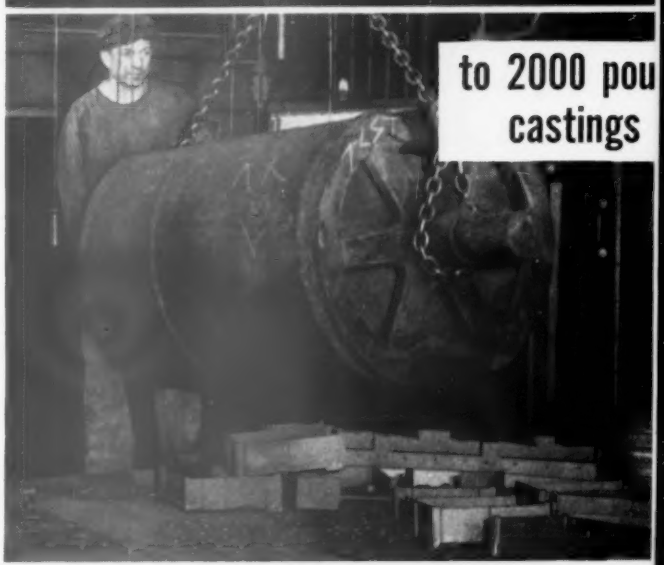
* Trademark of Pangborn Corporation

Saves $10,160 Yearly on Labor Costs

. . . . Cuts Cleaning Time 66⅔% for Harris-Seybold

NEW ROTOBLAST ROOM CLEANS ENTIRE FOUNDRY OUTPUT . . .





Cleveland Plant saves $48 daily on labor costs while cutting cleaning time on castings from 48 to 16 man-hours

Yes—this **new** Pangborn ROTOBLAST Room completely cleans **every single casting** Harris-Seybold make for their famous offset printing presses. That means old-fashioned sand-blasting bottlenecks are now eliminated . . . adding up to a **saving of 32 man-hours a day** . . . a better cleaning job in **⅓ the time! Actually $10,160 a year** are saved on labor costs alone!

Here are more savings: castings are **cleaner** than ever before, even though the intricate work ranges from one pound to one ton! That means **faster machining . . . less wear** on machine tools. Abrasive costs are lower with Pangborn ROTOBLAST, adding more savings to the record!

Pangborn ROTOBLAST: **Cleans faster** because it throws more abrasive over a larger area with greater density. **Cleans better** because it produces a finer surface than old-fashioned methods. **Cleans cheaper** because it requires less horsepower . . . uses less man power . . . needs less maintenance . . . eliminates need for air compressor!

FIND OUT HOW MUCH YOU CAN SAVE!

No matter what you clean . . . what you cast . . . Pangborn ROTOBLAST equipment saves you money on your cleaning operation. For complete details of how Pangborn ROTOBLAST can help you, write today for Bulletin 211A. Address: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland.

MORE THAN 25,000 PANGBORN MACHINES SERVING INDUSTRY

BLAST CLEANS CHEAPER

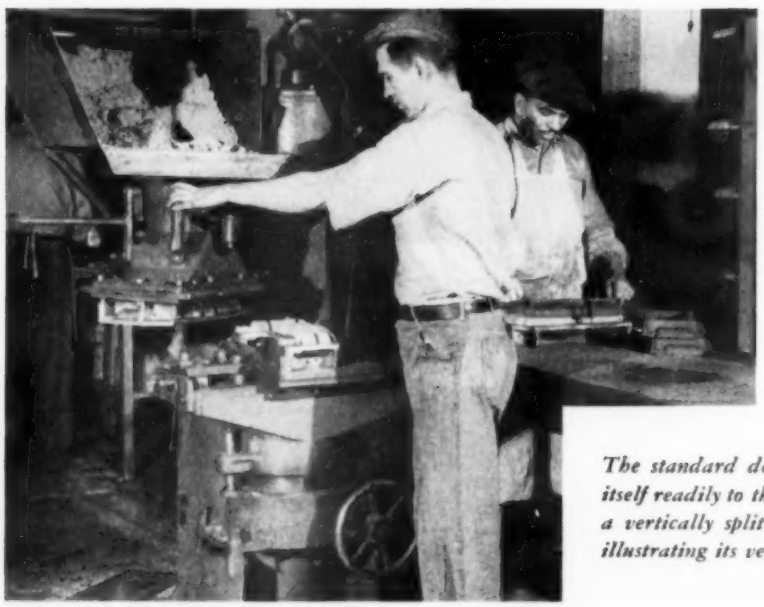
with the right equipment for every job

"Champion-ize" TO BRING DOWN UNIT COSTS!

QUALITY PLUS SPEED PLUS EASY OPERATION MAKE CHAMPION MACHINES THE FAVORITES

TYPE J-S
PORTABLE JOLT SQUEEZE

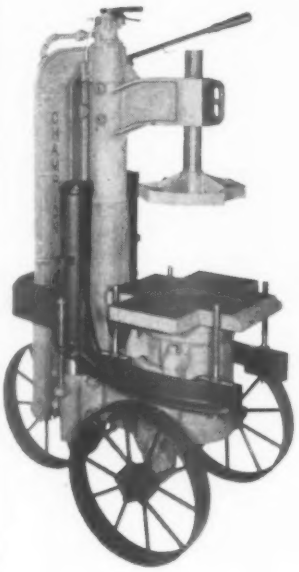
There's more to Champion performance than speed. And there's more to production efficiency than mere quantity. In leading foundries throughout the country, Champion molding machines and core blowers consistently score high on units per hour, plus greater precision, better finish, and less waste. There's something about these machines that seems to make it easier to do more work, better work and with less effort. For back of every Champion machine lies a vast experience in foundry practice, and each detail is designed with the user in mind. This extra thought expressed in a little more weight here, a little extra strength there, greater precision, greater stamina, all add up to á substantial plus value, realized by the user in terms of speed, ease, accuracy and adaptability to special conditions.



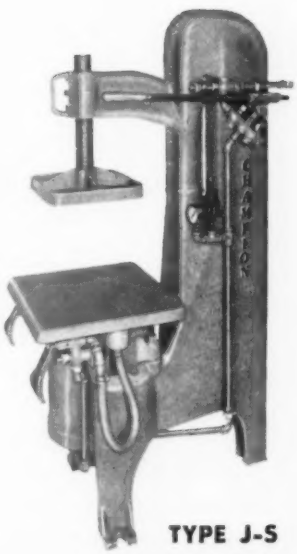
The standard design of the Champion core blower lends itself readily to the use of the attached cope, though at times a vertically split core box is used on this same machine, illustrating its versatility as a valuable feature.

TYPE J-M
POWER JOLT
HAND ROLLOVER
AND DRAW MACHIN

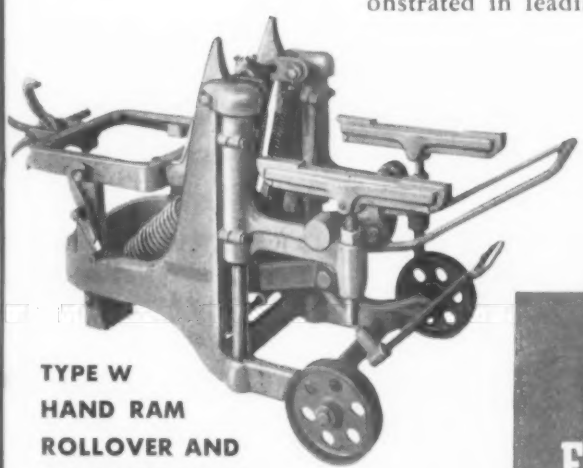
(Right and Below)
TYPE J-S-L
JOLT SQUEEZE PIN LIFT



If you have been waiting for new Champion Molding Machines, you will be glad to know production is greatly improved and deliveries are better every week. Most types are now being shipped from stock. What about looking over your whole production setup now, with a view to learning where some Champion equipment would do you the most good. By making it possible for less skilled workers to turn out more and better molds and cores, they reduce unit costs on basic operations and by raising his productivity, they broaden the opportunity for the individual worker. Lastly, they are designed and constructed for long-life and trouble-free operation, as demonstrated in leading foundries of the world, today.



TYPE J-S
STATIONARY
JOLT SQUEEZE



TYPE W
HAND RAM
ROLLOVER AND
DRAW MACHINE

WATCH FOR ANNOUNCEMENT OF
OUR NEW MODEL CORE BLOWER,
"THE CHAMPION JUNIOR"

CHAMPION
FOUNDRY AND MACHINE CO.
1318 W. 21st STREET CHICAGO 8, ILLINOIS

MOLDING MACHINES · ELECTRIC RIDDLES · CORE BLOWERS

*adds to the *Extra Value* in CHATEAUGAY PIG IRON

Between rough casting and finished lathe chuck, the machining operations are many and varied—calling for the highest possible machinability factor. That's why one of our largest chuck manufacturers insists upon the use of Republic CHATEAUGAY Pig Iron in his foundry.

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A Republic Pig Iron Metallurgist will be glad to show you how CHATEAUGAY consistently out-performs other pig irons. Write, wire, or phone *today.*

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Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

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FLOOR CAPACITY was increased in this Cincinnati, Ohio, foundry when two 8 x 10 ft *Foundromatic* shakeouts were installed in parallel. Foundry superintendent reports this multiple unit handles flask loads up to 71,000 lbs. In one nine hour shift they average as high as 40 complete molds!

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Flask breakage is cut to a minimum with *Foundromatic* shakeouts because load is evenly distributed over the deck during operation.

For additional information, call your nearby Allis-Chalmers Sales Office or WRITE FOR NEW BULLETIN 07B6365A.

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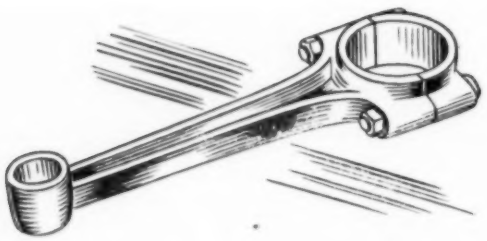
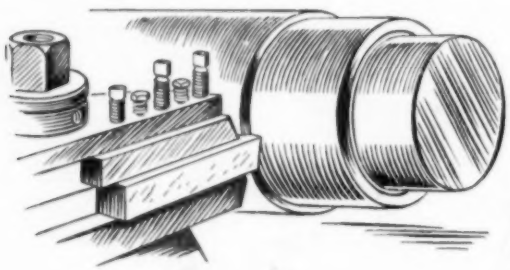
how VANADIUM improves—



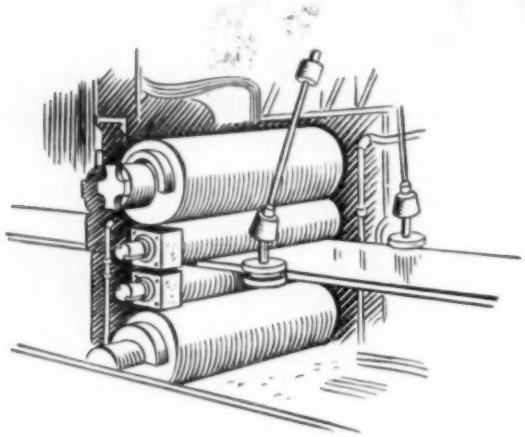
Engineering Steels . . .

Vanadium steels are tough because of their uniformly fine grain size. They are especially suitable for parts subjected to high dynamic stress. Vanadium-bearing steels also show exceptional resistance to abrasion and fatigue. Parts can be readily cast, rolled, or forged.



Tool Steels . . .

Nearly all fine tool steels contain vanadium. In the carbon-vanadium grades, this alloy helps control hardenability and improves cutting qualities. Vanadium carbides promote fine grain size and high wear resistance in all tool steels. High-speed steels depend on vanadium for a large measure of their high-temperature hardness.



Cast Iron . . .

In iron castings, such as those used for rolls in steel reduction mills, vanadium is an essential alloy. When added in amounts of 0.10 to 0.15 per cent, vanadium produces a marked increase in the strength of iron. Vanadium also helps produce castings which are remarkably free from growth and distortion and are suitable for service at moderately high temperatures.

Let our metallurgists show you how you can produce stronger, more uniform steel or iron by using vanadium. They will also gladly give you on-the-job technical assistance in the use of any other ELECTROMET ferro-alloy or alloying metal.

Write to the nearest ELECTROMET office.

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in the foundry, that is!

Use **"dag"** colloidal graphite dispersions for coating chills, patterns, and permanent molds.

Applied easily by spray or brush, **"dag"** dispersions provide a micro-thin colloidal graphite film that does not affect casting or mold thickness, and greatly improves surface quality. They will also eliminate or reduce the smoke usually caused by parting compounds . . . a definite advantage for the men in the shop.

Try **"dag"** colloidal graphite, too, for lubrication of push pins, shoulder screws and flask pins . . . eliminate binding and stripping.

Find out more about how **"dag"** dispersions can improve your foundry product and your working conditions.

Mail the coupon TODAY!

Coating a permanent mold with "Aquadag" at the Wisconsin Aluminum Foundry Company, Inc., Manitowoc, Wisconsin. "Aquadag" is the ***"dag"*** *colloidal dispersion of graphite in distilled water.*

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Cut CLEANING ROOM COSTS WITH FINER FINISH CASTINGS

DELTA S-5 BLACKOAT CORE AND MOLD WASH

Delta Blackoat S-5 Core and Mold Wash, for grey iron castings, is a product of scientific research, conducted by Delta Foundry Research Laboratory in cooperation with one of the leading grey iron foundries in the mid-west. It's development solves critical difficulties, inherent in grey iron casting, which have persistently plagued foundrymen and foundry technicians.

Delta Blackoat S-5 is a distinctly new and different wash. It provides all of the well-known advantages of other Delta Core and Mold Washes plus the added advantages listed below.

Write for complete information. If you wish it we will send a liberal working sample to you for test purposes in your foundry.

5 IMPORTANT FACTS TO CONSIDER . . .

1. It's new and different. It has qualities and characteristics contained in no other wash. It substantially reduces cleaning room costs and greatly improves casting finish.

2. It produces results, on grey iron castings, unequalled by any other wash. It will not deform cores. Edges and corners remain clean and sharp.

3. It costs less to buy and is considerably more economical because you use it at a lower Baume.

4. It can't flake or peel because it anchors itself by penetrating onto the sub-surface sand grains of cores and molds. It greatly increases the surface hot strength of the sand which prevents veining and metal penetration.

5. It is easily applied and adheres to any sand surface . . . green or dry . . . and produces a smooth, highly refractory, waterproof surface over which molten metal flows faster and without interruption.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

* *Test conducted by Crucible Steel Castings Co., Lansdowne, Pa.*

-FLASH-

SENSATIONAL MALLEABRASIVE SAVES FOUNDRY* $5283.20 A YEAR!

SAVES 43.3% ON ABRASIVE ALONE!

Yes sir, this exhaustive seven week test proved it took *43.3% less Malleabrasive* to get steel castings completely clean!

REPLACEMENT PARTS COST CUT 66.4%

A big saving on replacement parts . . . plus other savings on time and labor. That's the way Malleabrasive works to cut your blast cleaning costs as much as 50%!

TOTAL SAVINGS OF 35.9% ADDS UP TO $5283.20 IN CASH!

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We'll send you the data you need to run comparative tests *right in your own cleaning room!* Now you can see for yourself how it's possible for Malleabrasive to cut blast cleaning costs up to 50%! Malleabrasive is more than just "heat treated" or "annealed" . . . *Malleabrasive is guaranteed to out-perform ordinary shot and grit* when these comparative tests are properly run. For full information . . . including the results of five Malleabrasive tests recently completed . . . write today for TEST INFORMATION, THE GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

Packed in new orange striped 100 pound bags.

PATENTED†

Malleabrasive®

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THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO

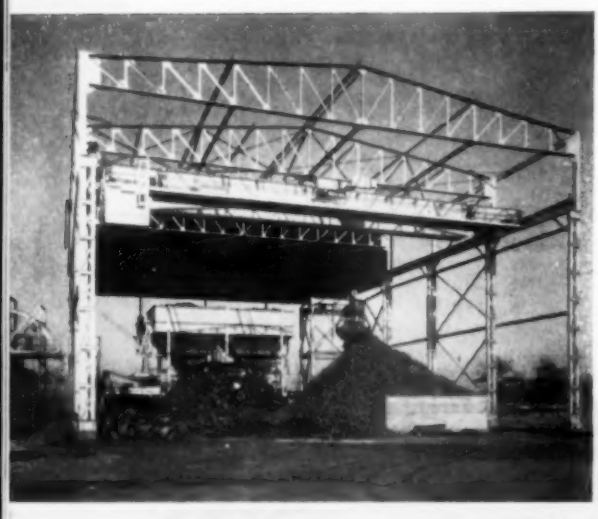
• MANUFACTURERS OF METAL ABRASIVES SINCE 1907 •

2-Man Charging Crew for #9 Cupolas

HOW WHITING MECHANICAL CHARGING SERVES THE KEEN FOUNDRY AT GRIFFITH, INDIANA

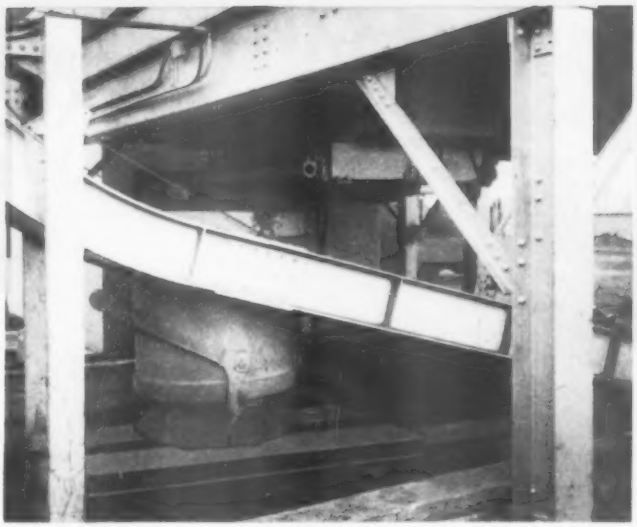
Planning for future expansion, the Keen Foundry has installed make-up equipment and a Whiting Swivel Charger to serve the #9 Cupola now in operation. The same equipment will also serve other cupolas as they are added, without requiring any increase in the present two-man charging crew. Such an installation can be designed to serve a battery of four cupolas—two being operated simultaneously each day while the other two are down for relining.

The Swivel Charger at Keen represents the most recent Whiting development, since it is designed so that either cone-bottom or drop-bottom buckets may be used. A full-cone-bottom bucket is now being used, as shown

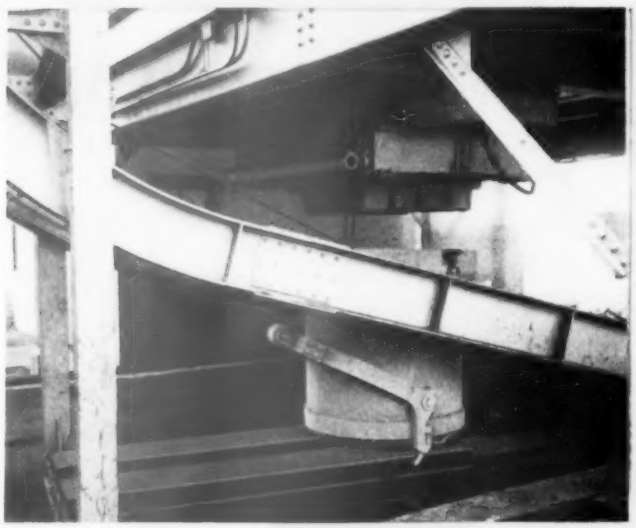


View of the Keen Foundry with materials yard in foreground. Crane with clamshell bucket is loading coke-and-stone bins.

Close-up of the charging operation. One operator handles the skip hoist, and also the motor-operated traveling coke-and-stone weigh hopper. The other operates the crane, making up metal charges and keeping coke-and-stone bins filled. The #2 scale is in full view of the crane operator as he makes up the metal charge. A second scale can be seen on the batch weigh hopper.



Two views showing operation of the automatic bucket-closing mechanism. At left the bucket is open—the cone about to come down against the rollers which raise it against the latch. Below, the bucket has closed and latched, ready to receive the next charge.



in the illustrations on this page . . . a bucket which, instead of employing the conventional "wishbone," is discharged by a release lever which opens automatically when the bucket is placed in position in the cupola, and closes automatically as it returns to position beneath the loading platform.

WHITING CORPORATION

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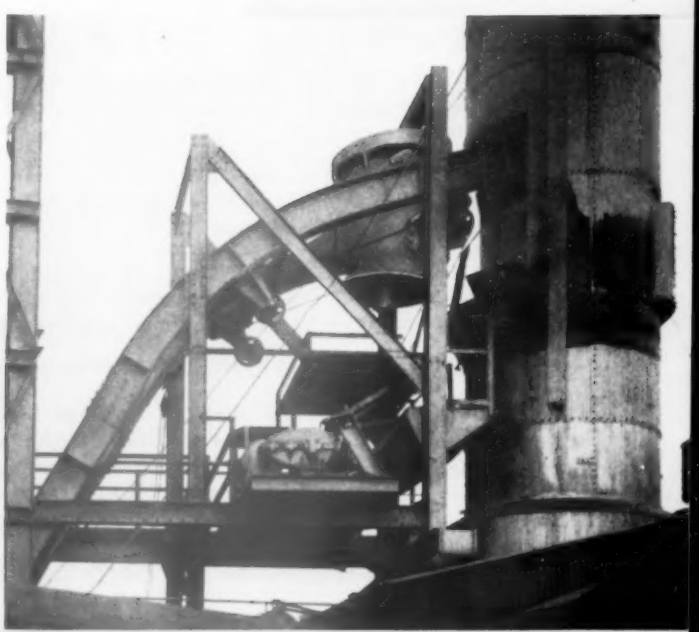
Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.



The cone-bottom bucket emerging from the charging door, ready to descend the skip and receive another load.

Tapping the cupola into a U-ladle. Whiting is prepared to mechanize every part of foundry operation from "yard to ladle."

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The new Fisher Simplex replaces a conventional oil fired spherical type open flame furnace. Check this "Before and After" story of faster melting, lower fuel cost, and lower metal losses.

	BEFORE	AFTER
Heating time 1000 lb. charge	2½ hrs.	1 hr.
Fuel cost per pound melted	$.0056	$.0027
Metal Loss	5%	3%

FISHER ADVANTAGES

Furnace charges *easily* from front at convenient height. . . . More scrap can be charged because of large area above molten metal line. . . . Uses open flame reverberatory melting, the *fastest* fuel fired melting method. . . . Two section furnace shell removable for *easy* relining.

Ask for bulletin #28-A "Fisher Simplex Furnaces."

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

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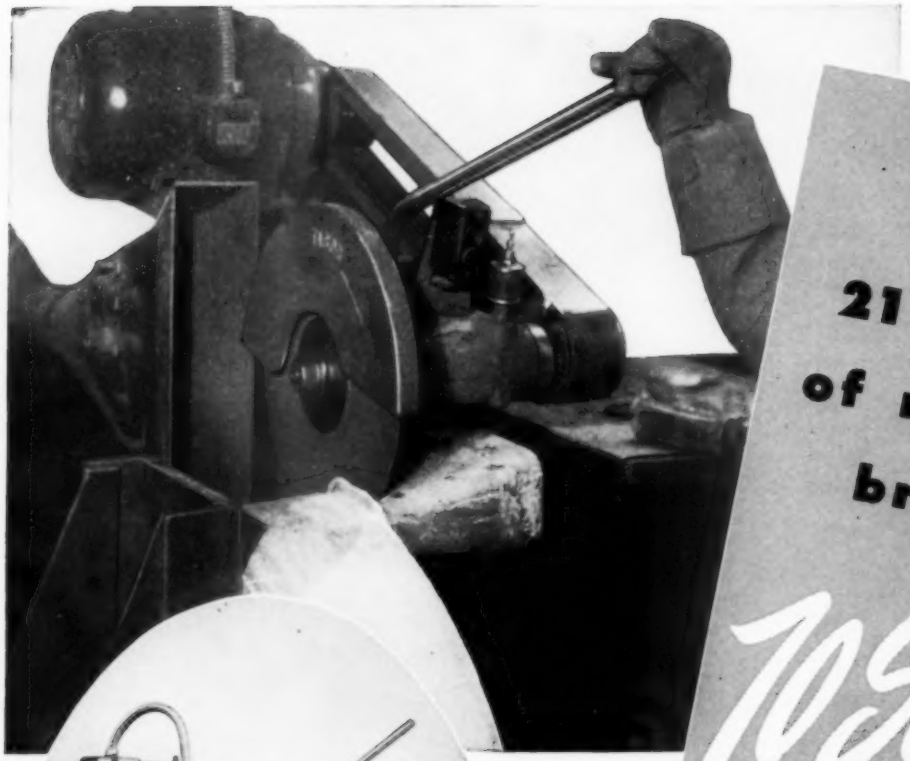
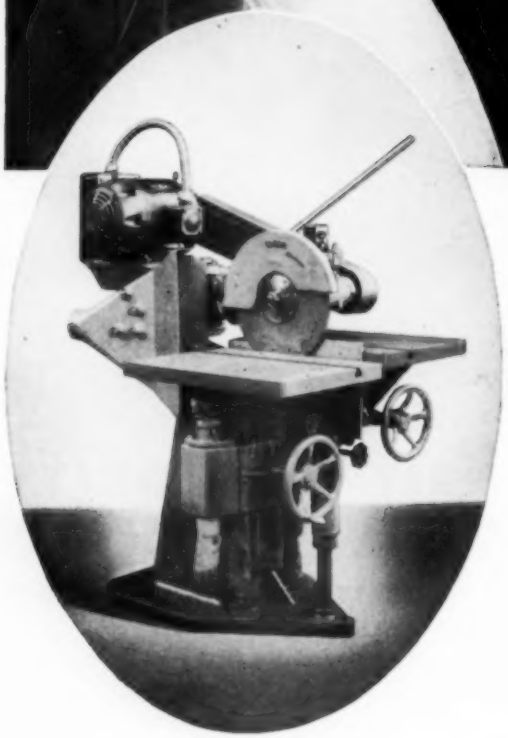


Through 21 sq. inches of manganese bronze in *10 Seconds!*



That's a mighty fast cut for a 16" wheel driven by a 10 H.P. motor—a good example of how top-speed production schedules are "meat" for Tabor-Brasive Cut-Off Machines.

These rugged machines cut gates and risers from non-ferrous and ferrous castings in a matter of seconds. Clean, close cuts, too, that slash snagging and finish-grinding costs to the bone—often do away with them entirely.

And for the *really tough* cutting jobs—in steel foundries—in copper cutting (either gates and risers or crucible feed stock)—wherever the going's the toughest, Tabor makes a big-value 15 H.P. cut-off.

Any way you look at it, a Tabor-Brasive Cut-Off Machine—equipped with today's hard-to-break, safe-to-use wheels—is *your* answer to more cuts at less cost, with safety.

Write, wire or 'phone for more details.

SPECIFICATIONS

Motor	Table Size (Split Type)	Wheel Diam.	Max. Height of Work Under Wheel
10 H.P.	36" x 25"	16" Max. Thickness—5/32"	20" (with head over table) 46" (with head swung to side)
15 H.P. (Two Speed)	41" x 30"	20" Max. Thickness—3/16"	18" (with head over table) 44" (with head swung to side)
All motors fully enclosed, fan-cooled, ball bearing			

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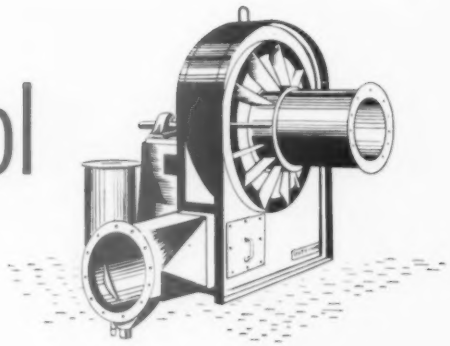
Roto-Clone dust control GIANT SIZE



12′ x 16′ shakeout at Johnstown Works of Carnegie-Illinois Steel Corp., equipped with AAF-designed Shakeout Hood and Type W Roto-Clones

HERE'S evidence that it is practical to provide dust control for large size shakeouts. This 12′ x 16′ unit is equipped with an AAF designed hood and three No. 36 Type W Roto-Clones* (Arrangement A) exhausting a total of 90,000 C.F.M. One glance at the picture tells you another major dust problem has been solved.

The Type W Roto-Clone is a logical solution to this problem because of its low cost and small space requirements. This wet-type collector offers high efficiency in dust collection, *including extreme fines,* and is capable of handling air volumes from 1,000 to 50,000 C.F.M. as a single unit.

Applying dust control to shakeouts of this size is not unusual at American Air Filter. A complete line of products, plus years of experience in engineering Roto-Clones to meet every foundry need, is your assurance of obtaining a practical solution to your dust problems. For complete information, call your nearby AAF representative or write direct to—

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266 Central Avenue, Louisville 8, Ky.
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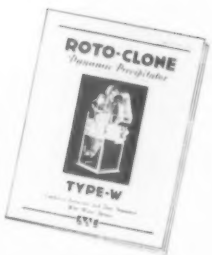
ALL THE FACTS ON THE TYPE W ROTO-CLONE

Bulletin No. 274-A tells you what makes the Type W tick. It's fully illustrated and has all the facts. Write for it now!



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**Roto-Clone is the trade-mark (Reg. U.S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

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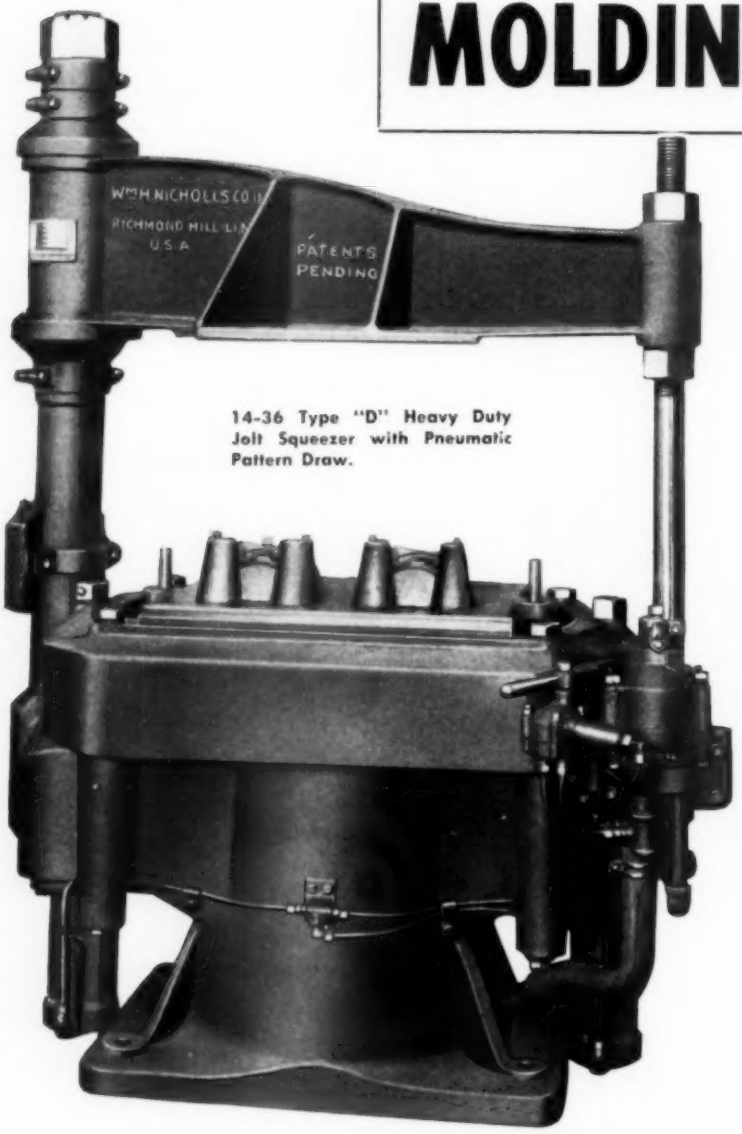

14-36 Type "D" Heavy Duty Jolt Squeezer with Pneumatic Pattern Draw.

are definitely mechanical champions for consistently turning out a maximum number of good molds. This is a direct result of dirt-proof housings and forced lubrication which have been provided for all parts that might otherwise wear quickly. Remember, too that the number of moving parts are kept to a minimum, hence there is no lost motion and less confusion for new workmen.

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ALLOY

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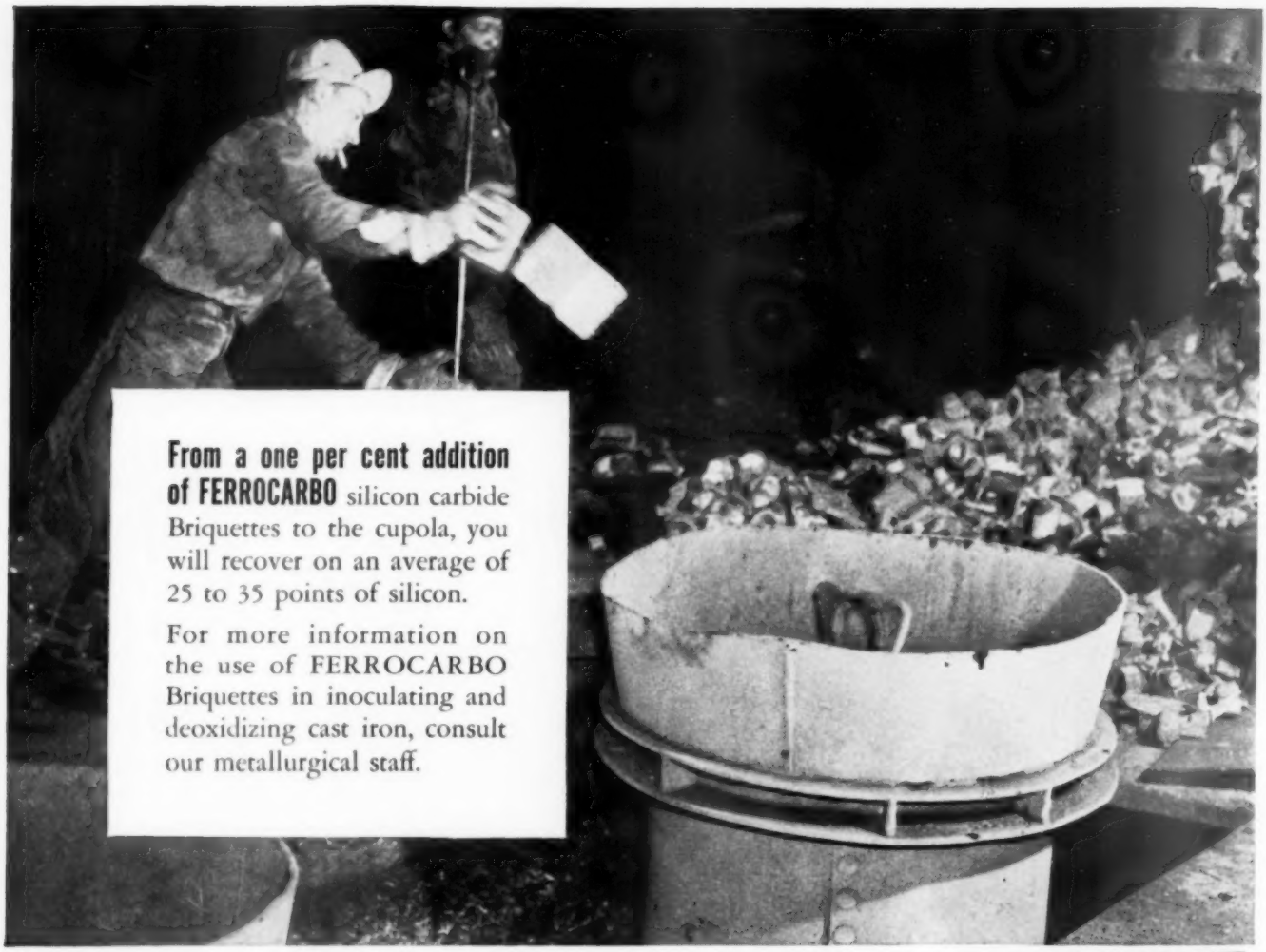
Silicon Recovery from FERROCARBO Briquettes

BY CARBORUNDUM
TRADE MARK



From a one per cent addition of FERROCARBO silicon carbide Briquettes to the cupola, you will recover on an average of 25 to 35 points of silicon.

For more information on the use of FERROCARBO Briquettes in inoculating and deoxidizing cast iron, consult our metallurgical staff.

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BY CARBORUNDUM
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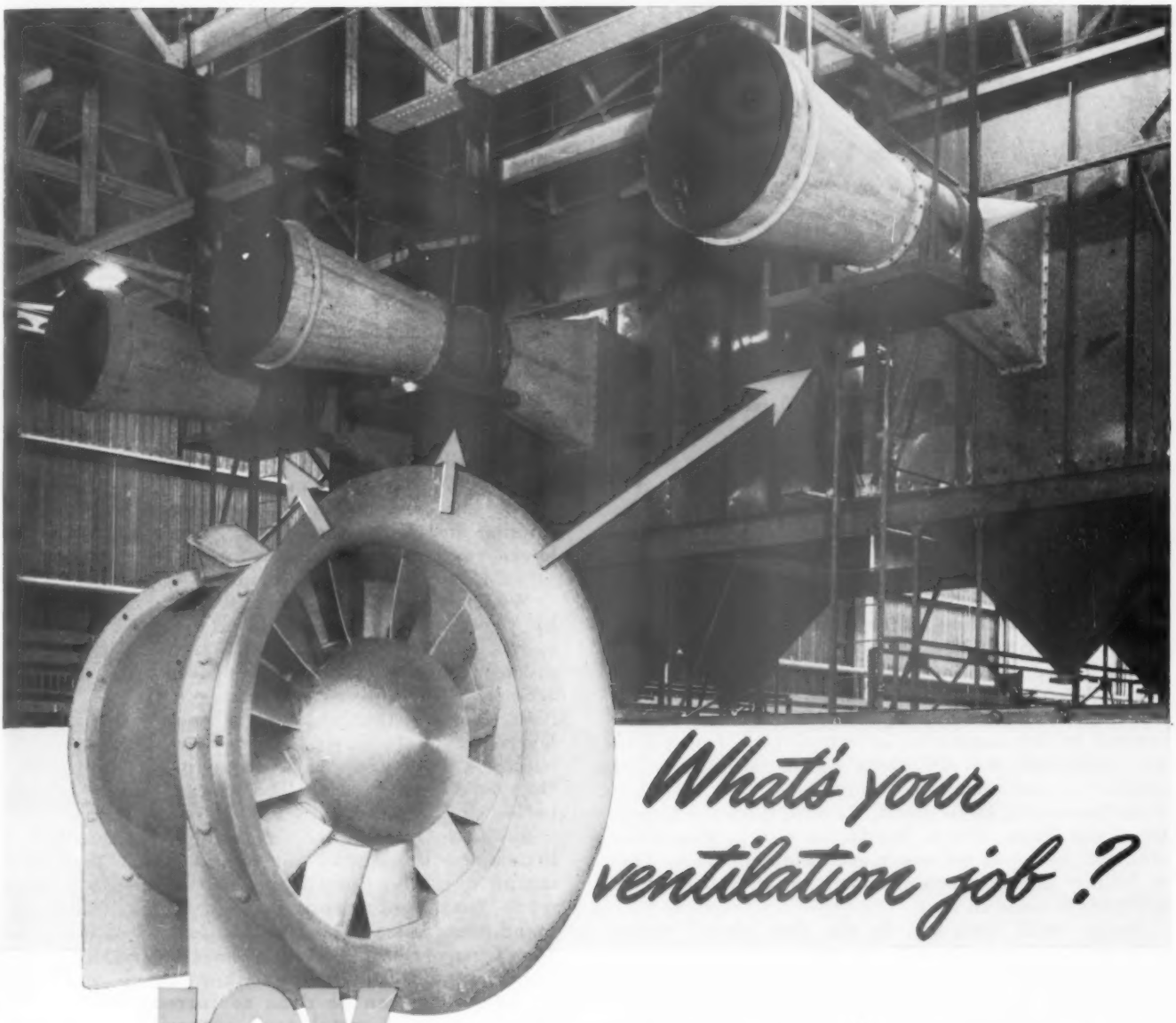

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LET'S KICK IT AROUND

By TOM BARLOW

Scrap piles to right of them.
Scrap piles to left of them.
Scrap worries foundrymen,
Aches by the hundred!

— Apologies to everybody.

The trouble with asking questions is that you get answers. We have been asking you to comment on this column. Some of the answers have been veddy, veddy flattering. The other kind I'm ignoring—so there. There have been some specific requests and suggestions as to what we can do with this page—some of those I'm ignoring, too. The most frequent request is for comments on scrap. (It's funny—no one suggested we say more about the wonderful quality of our unsurpassed products, such as Black Hills Bentonite, Dixie Bond, Revivo, Buckeye Ganister, Core Paste, Dura, Bondactor Guns, Westonite, etc., etc., etc.—so we won't even mention them. This is killing our advertising man, tough-hided as he has had to come to be.)

Scrap—well, let's see. In the first place, "we're agin it." More people talk about scrap than ever do anything about it. Scrap is what a foundryman buys, but doesn't want; makes, but can't sell. Scrap is what a cupola can make good metal out of, and a molder can make good metal into. (My English teacher would drop dead.)

Permit me, sir, to stress a point: that scrap can be the difference between profit and loss.

The first step toward scrap reduction is—*get the proper attitude!* Until every man in supervision really gets scrap-minded, a reduction is slow and very painful. It may be hard to change your thinking from, "Whose fault is this?" to, "What can *I* do to correct this?" but the change must be made if you want real progress . . . Scrap reduction is more important this year than it has been for the last ten years. We have been through a ten-year period during which high production was the only important consideration. Today cost is King. And all along he has proved to be such a disagreeable sort of monarch that we all take a special delight in getting the better of him.

To illustrate: during the past ten years a foundry could let the percentage of scrap increase if the production increased even faster. Many foundrymen deliberately and correctly permitted scrap to jump from 5 to 10% in order to realize a 20% increase in production. What happens if the cycle reverses?

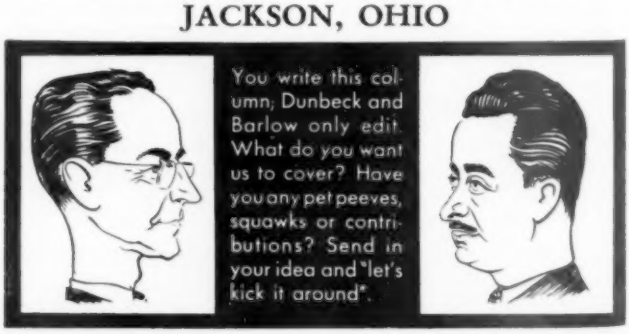
Suppose the foundry was producing 100 tons of castings per day at a cost of $180 per ton. Assuming a scrap pile of 5% and a selling price of $200 per ton, the foundry sold 95 tons of castings for $19,000. The gross profit (before taxes, overhead, sales expense, gambling debts and liquor) was $1,000. Now suppose sales drop to the extent that production is reduced to 60 tons per day. Assuming the same cost per ton and the same selling price, the gross drops to $600 (and the net disappears). However, if the foundryman could reduce his scrap from 5% to 3% he still makes $840. If he cuts scrap to 2% he makes $960, and if he cuts scrap to 1% he realizes $1080—or more money than was made with a production of 100 tons per day. . . Get the point? The lower your production, the lower your percentage scrap, if you want to keep going.

What to do about it? Next month (if I'm not fired by then) we can get technical, but let's try one more generality. *The second step* toward scrap reduction (the first was attitude — remember) *is research.* Now don't let that word scare you. Did you ever try on six pairs of shoes before you found a perfect fit? Does your wife squeeze the oranges before she buys? That's research.

Suppose decreased production leaves you with a little spare time. Why not use that time to reduce scrap? Actually, reduced production demands more work from supervision, just as reduced sales demand more work from salesmen. Instead of using the time for worrying, let's try research. First, look over the scrap records and decide what caused—no, that's wrong—what can be done to correct most of the scrap. Is it gates, metal, sand, supervision, materials, or equipment? Pick the one that offers the greatest return (I'll bet on gates and risers) and go to work. Build a baby cupola, pot furnace or electric oven in the corner and start to fuss with the troublesome patterns. Try this and that—then try that and this. Try different sand facings. slower pouring, faster pouring, larger gates, smaller gates, etc. It's more fun than Canasta, it's good exercise—and it pays off.

Don't miss next month's exciting sequel.

EASTERN CLAY PRODUCTS, Inc.
JACKSON, OHIO


You write this column; Dunbeck and Barlow only edit. What do you want us to cover? Have you any pet peeves, squawks or contributions? Send in your idea and "let's kick it around".

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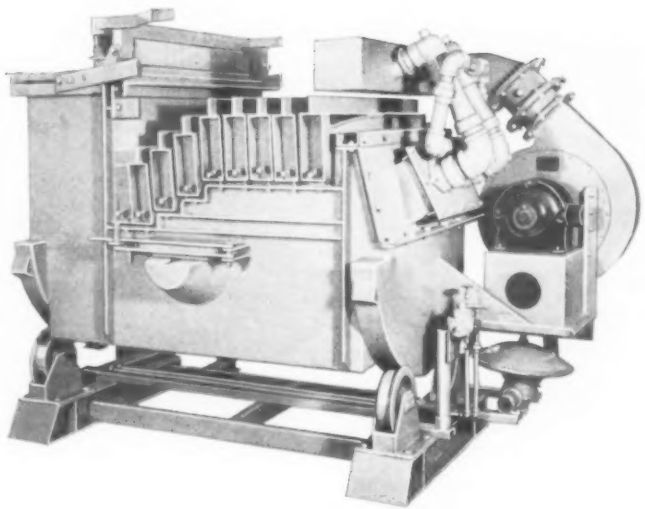

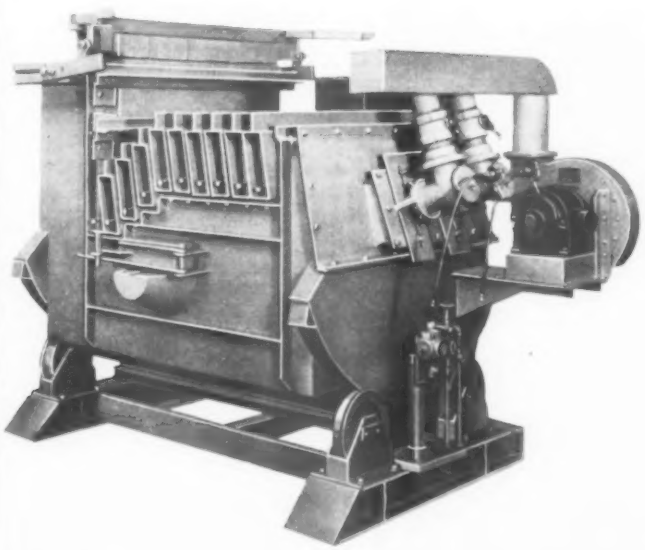

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INVESTIGATE these Stroman Economelt Furnaces for Gray Iron . . . they have proved their efficiency and are now in operation in many gray iron foundries . . . Drop a note for full information . . . Do it to-day.

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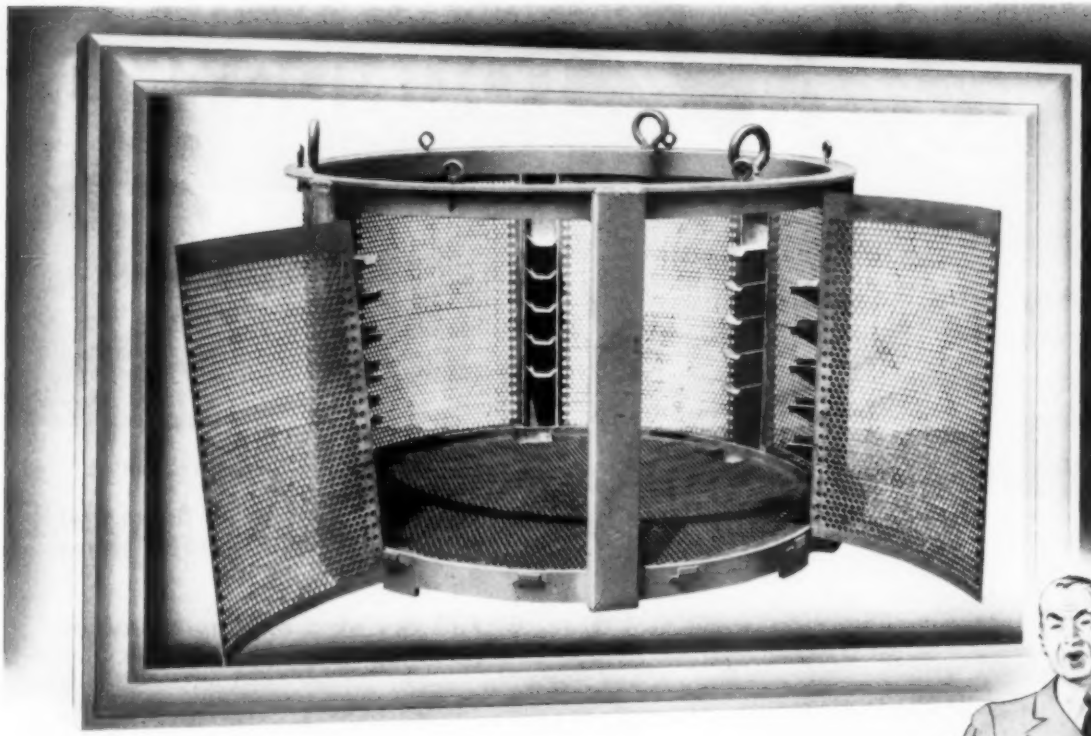

Still-life Picture of a

LIFE-SAVER FOR THIS MAN

The squeeze is on . . . . In case you are not feeling the increasing pressure between production costs on one side and competitive selling prices on the other, well, may the happy days continue!

But if, like most of the rest of us, you are vigorously probing for soft spots in the "production-cost" jaw of the vise we can help you. The annealing basket, pictured above, is an example. These specially designed units cut our customer's cost of treating a volume of small parts in four ways. First, due to their removable sides and trays, one and some times more complete handlings of the parts were eliminated. Second, weighing 2/3 less than cast containers, the baskets themselves handled faster and, third, attained pot heat in less time. Fourth, being less bulky, they greatly increased furnace capacity.

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FOR *ECONOMICAL* CUPOLA OPERATION

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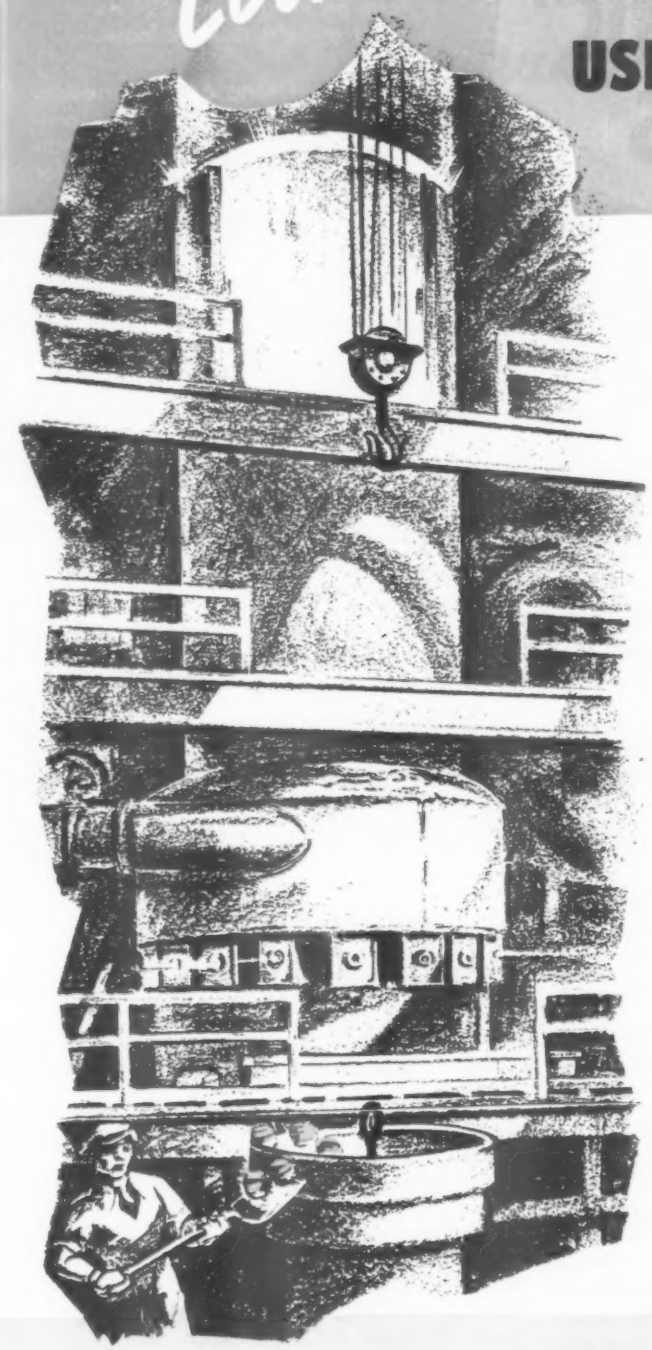

Economy is an important factor in every cupola operation. It will pay you to consider the advantages and resultant savings on material costs made possible by the use of Ohio Ferro-Alloys Briquets.

You may select the most economical charge of scrap and pig iron and adjust the analysis with these Briquets.

THE FOLLOWING ARE AVAILABLE

Kind of Ohio Ferro-Alloys Briquet	Color	Contained Alloy
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Silico-Manganese	yellow	½ lb. Silicon and 2 lb. Manganese
Manganese	red	2 lb. Manganese
Chrome	green	2 lb. Chromium

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Snyder Foundry Supply Co., Los Angeles 11, California.

"FOUNDROMATIC" SHAKEOUTS

Heavy plate steel deck is welded to transverse and longitudinal support beams to form an integral unit . . . no rivets or bolts to work loose.

Steel sand guard surrounds entire shakeout body . . . protects motor, drive and mechanism. Openings provided for inspection and lubrication.

Entire weight of shakeout plus casting and sand load is supported by resilient springs at each end of shakeout. Bearings are required only to take care of centrifugal force of mechanism.

Pivoted motor base maintains uniform tension on *Texrope* V-belts regardless of load . . . results in long belt life.

Integral balance wheel and sheave included as standard equipment. Allis-Chalmers motor, drive sheave, *Texrope* V-belts and pivoted motor base complete true-running drive.

Shakeout body is a one-piece weldment of heavy steel plate. Structure is stress-relieved after welding and before machining . . . giving greater resistance to shock and vibration.

Increased Capacity and only 2-Bearings to Maintain

REDUCED MAINTENANCE features are incorporated in the 2-bearing *Foundromatic* shakeout —bearings carry only centrifugal force of mechanism . . . entire unit is stress-relieved after welding . . . heavy pipe spacer encloses and protects mechanism. YOU GET INCREASED CAPACITY because 2-bearing *Foundromatic* shakeouts are built for heavy-duty application. Impact load is not limited by size of bearings—shaft is shorter and sturdier than in conventional units.

90% OF VIBRATION AND SHOCK are absorbed by resilient support springs in the *Foundromatic* shakeout. Long life is obtained from springs because bumper guides eliminate the possibility of overstressing the springs if shakeout is loaded beyond recommended capacity.

Your requirements can be met by one of eight *Foundromatic* shakeout sizes from 4 x 6 ft with capacity of four tons, to 8 x 10 ft with capacity of 25 tons. Multiple shakeouts can be supplied with capacities of 100 tons or larger. Call your A-C Sales Office for information, or write for new Bulletin 07B6365A. A-2785

ALLIS-CHALMERS, 1032A SO. 70 ST. MILWAUKEE, WIS.

Foundromatic, Texrope and *Regulex* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Foundry Equipment for Bigger Output-Better Working Conditions!

VIBRATING SCREENS | CUPOLA BLOWERS | MOTORS-DRIVES-CONTROL | FOUNDROMATIC CORE DRYER | INDUCTION HEATING & MELTING | REGULEX ARC FURNACE CONTROL

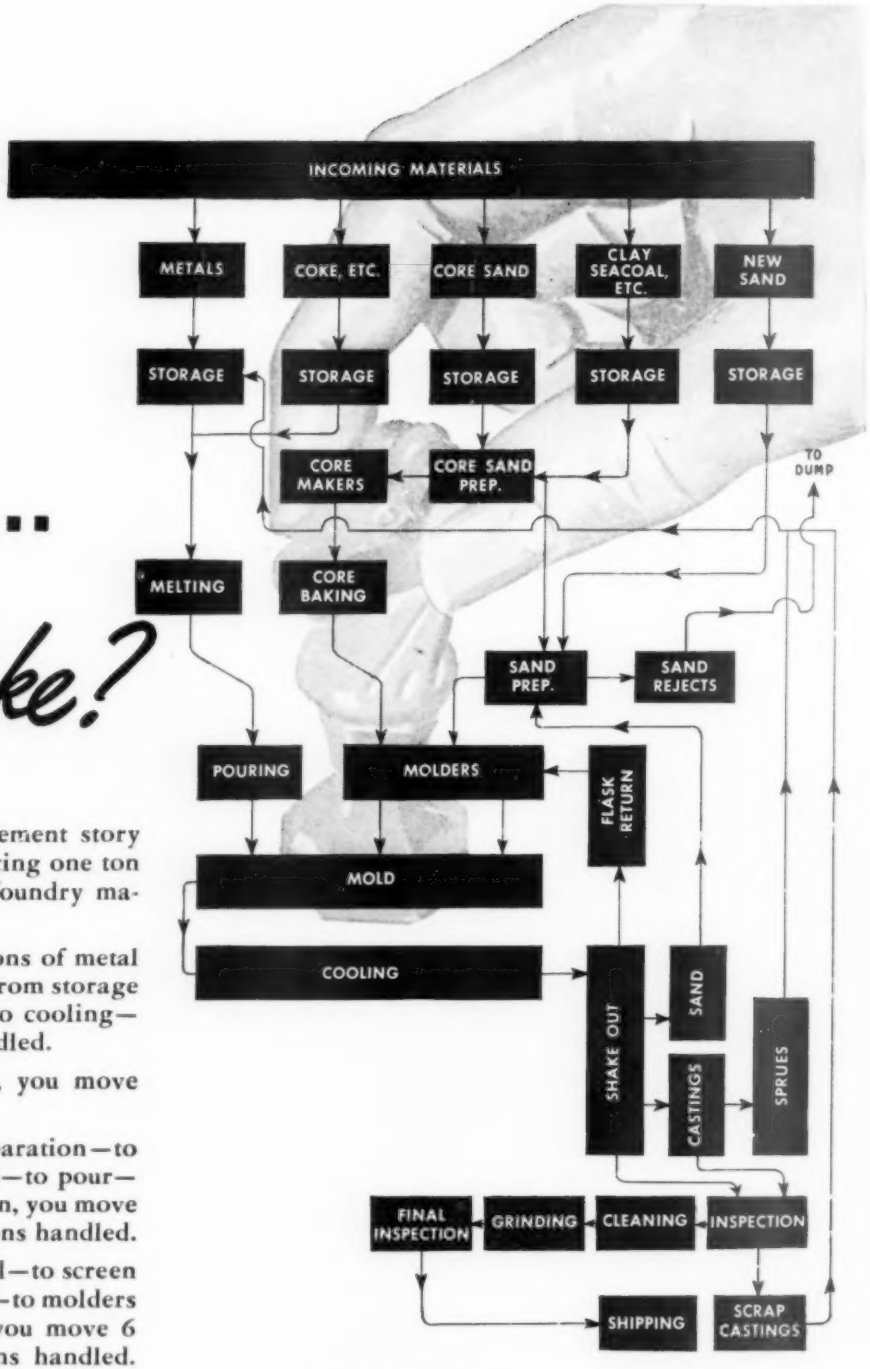
Trademarks of Distinction

THESE and many other leading manufacturers in the motor field protect their products with Tousey Casting Sealer. Tousey originated the manufacture of casting sealer to rigid specifications. Copies of these specifications, revised over the years to meet current needs, are available on request.

TOUSEY VARNISH CO., 520 W. 25th Street, Chicago 16, Ill.

TOUSEY PRODUCTS
CASTING SEALER

HOW MANY MOVES.... *do you make?*



HERE'S the complete material movement story for the average foundry in producing one ton of castings as demonstrated on this foundry material flow chart.

METALS. Figuring an average of 1.3 tons of metal per ton of castings, you move 1.3 tons from storage —to melting—to pouring—to mold—to cooling—to shakeout for a total of 6.5 tons handled.

COKE, ETC. From storage to melting, you move .12 average tons.

CORE SAND. From storage—to preparation—to cores—to racks—to ovens—to molders—to pour—to cooling—to shakeout—to preparation, you move .5 tons of sand nine times. Total 4.5 tons handled.

SAND. From shakeout—to iron removal—to screen —to storage—to mullers for tempering—to molders —to pour—to cooling—to shakeout, you move 6 tons nine times for a total of 54 tons handled.

SAND REJECTS. From preparation tower to dump, you move 3 tons.

FLASKS. From molding station—to pour—to cooling—to shakeout—to molding station, you move 1 ton four times. Total 4 tons handled (not including boards and weights).

CASTINGS. From shakeout—to inspection—to cleaning—to grinding—to inspection—to shipping—to carrier, you move 1 ton six times (minimum). Total 6 tons handled (not counting heat treatment).

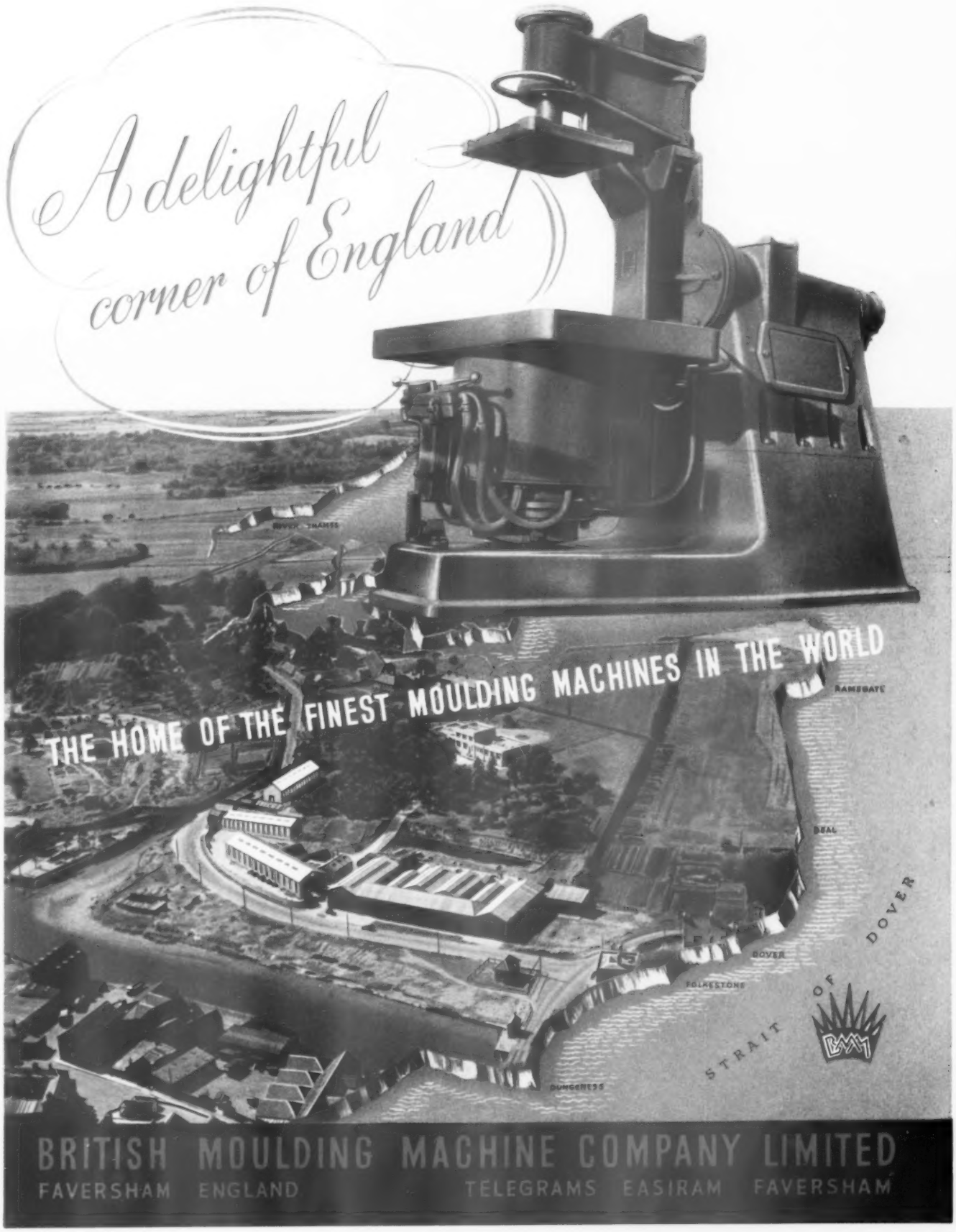
SPRUES AND SCRAP. From shakeout—to inspection—to remelt, you move .3 tons twice. Total .6 tons.

TONS. An average minimum of 78.72 tons of materials handled to produce one ton of castings in the average foundry.

A Rex Foundry Engineer will be glad to show you how you can reduce the cost of foundry material movement with a Rex Foundry System. Chain Belt Company, 1671 West Bruce St., Milwaukee 4, Wis.

CHAIN BELT REX COMPANY

FOUNDRY HANDLING SYSTEMS


A delightful corner of England
THE HOME OF THE FINEST MOULDING MACHINES IN THE WORLD
RAMSGATE
DEAL
DOVER
FOLKESTONE
DUNGENESS
STRAIT OF DOVER
BRITISH MOULDING MACHINE COMPANY LIMITED
FAVERSHAM ENGLAND
TELEGRAMS EASIRAM FAVERSHAM

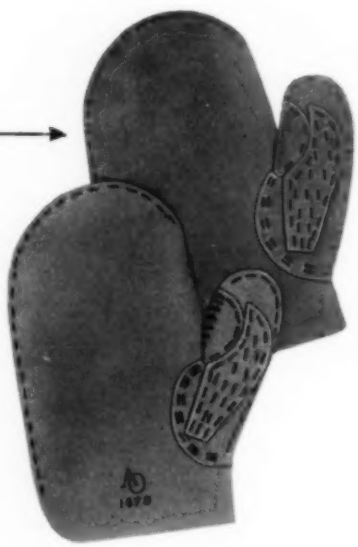
AO Safety Clothing

When workers come to grips with Rough Stock . . .

HERE'S PROTECTION and SERVICEABILITY!

AO 142 CL Apron One of a complete line of AO aprons for body protection against sparks, splashes, cuts and abrasions met with in grinding, tending blast furnaces, bench work, drill press work and other operations. No. 142 CL is regular type (non-split leg) in chrome leather.

AO 1678 Reversible Mitten: As its name suggests, this mitten may be worn on either hand thus providing DOUBLE THE WEAR. Chrome-tanned cowhide, reinforced with steel-stapled leather patch on both sides of thumb. All seams steel sewed. "Made-to-order" for handling steel sheet stock, scrap, wheel castings.



AO 1201 Hand Pad This popular hand guard of chrome-tanned cowhide leather features a palm reinforcing patch which is steel sewed. Open back. Fully protected thumb. It is the hand pad to use for handling steel scrap and rough steel. When worn over gloves it greatly adds to glove life.

AO 5X138 Glove Fingers and thumb of this chrome-tanned cowhide glove hold up longer under heavy wear. The index finger is stapled from top of finger to crotch of thumb—second, third and fourth fingers are stapled from finger tips to palm. Steel stapled leather thumb patch. Steel stitched seams and 4" cuff. It's the steel mill favorite for use on flying shears and handling rough scrap.

Your nearest AO Safety Products Representative can supply you

American Optical Company
Safety Products Division

Southbridge, Massachusetts • Branches in Principal Cities

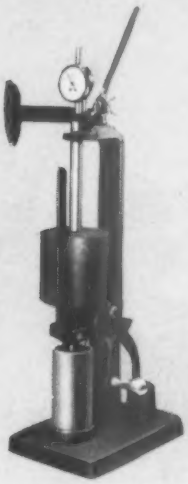
IF YOU WANT BETTER CASTINGS . . .

Control SAND-CORES-MOLDS

SAND

MOISTURE TELLER an instrument for either plant or laboratory which flash-dries sand samples for accurate moisture determination.

SAND RAMMER accurately reproduces the ramming of specimens to be tested for permeability, strength, density and flowability.



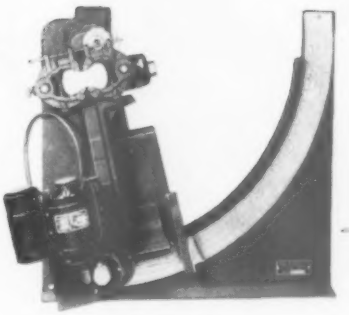
PERMMETER quickly and precisely determines the A.F.A. standard permeability of all molding materials. A direct reading unit.

SAND STRENGTH MACHINE determines green or dry compression and shear strength of sand—also deformation to determine plastic strength. It is either indicating or recording.

CORES

BAKING OVEN provides accurate control of core baking for core research and binder testing.

CORE PERMEABILITY TUBE is used with the Permmeter to determine the A.F.A. Permeability of baked cores and dried specimens.



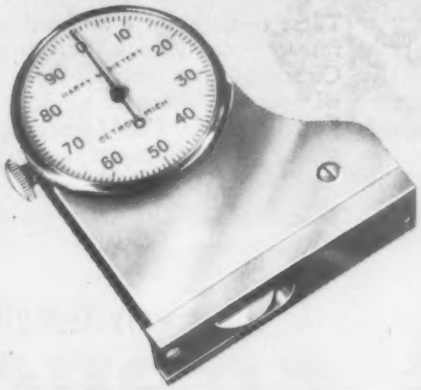
TENSILE CORE STRENGTH ACCESSORY attached to the Sand Strength machine determines tensile strength of baked core specimens.

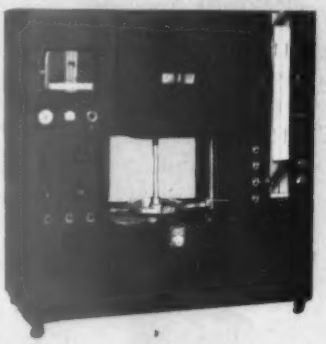
GAS DETERMINATOR measures volume of gas released by any core or molding sand mixture —used also to check baking practice.

MOLDS

MOLD HARDNESS TESTER determines hardness of green sand molds or green cores—also compressive strength of mold surface in psi.

CORE HARDNESS TESTER measures surface hardness of baked cores and dry sand molds.





DILATOMETER: a complete high temperature testing laboratory. Predicts behavior of sand and core during pouring, solidification and shakeout.

2951

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND · MOLD · MOISTURE · SULFUR · CARBON

A note on Abrasives

The Advantages you get from "Advanced" Technical Research

During the war, a shortage of bonding material, used in making grinding wheels, developed. This situation could have presented a serious problem...except for the fact that it had been anticipated. A substitute had been largely developed in advance by our researchers and now was rushed into service. Not only did it fill the immediate need...it proved superior and continues in current use.

In developing and producing better abrasives, science and production agreed the answer might be found in a study of the development of silicon carbide and aluminum oxide crystals in a furnace where operating temperatures exceeded 2000°C. Not only did researchers of The Carborundum Company develop a high-temperature microscope for this work—they hooked it up with a camera to photograph the reaction in color.

These two, out of a hundred and one research activities underway at The Carborundum Company, help explain why the right abrasive products by CARBORUNDUM are ready whenever new high-temperature alloys or other new materials are developed, or new industrial techniques put into operation.

From these laboratories have come wheels that precision grind thousands of parts with unvarying accuracy...belts and discs that cut faster and cooler, grains that generate high finishes in a hurry. It is an extra assurance of continual improvement in grinding, sanding and finishing with abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

The only complete line of Abrasive Tools is

CARBORUNDUM

TRADE MARK

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

Engineering News
ON ABRASIVE PRODUCTS

ALOXITE TPT POLISHING GRAIN

TPT is a new aluminum oxide abrasive grain specially developed for polishing operations which require removal of comparatively large amounts of metal. Especially suited for severe polishing operations, it cuts fast and is highly efficient. In actual comparative tests, this tough, sharp, long lasting abrasive gives as much as 100% greater production per wheel set up. It is also ideally suited to the entire field of grain polishing applications and can be applied successfully and economically within its available grit range, sizes 16 to 60.

TPT POLISHING GRAIN OFFERS THESE IMPROVED QUALITIES:

TOUGHNESS—Special processing assures resistance to fracture, on severe operations. Polishing wheels headed with TPT grain last longer and require heading less frequently.

UNIFORMITY—All working grain, solid, well-shaped, sharp and angular—free from useless flats, splinters and weak particles.

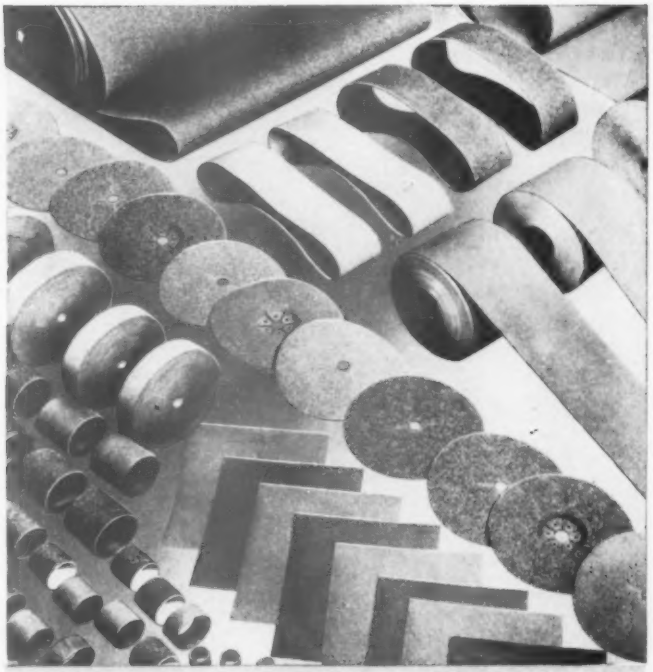
FASTER CUTTING—Sharp particles retain sharpness and angularity for longer periods...provide higher production rates and more economical operation.

IMPROVED EFFICIENCY—Each set-up lasts longer, produces more pieces per hour, and cuts abrasive and polishing costs. Longer lasting polishing wheel set-ups reduce number of expensive re-headings.

THE VONNEGUT BRUSH-BACKED SANDER HEAD

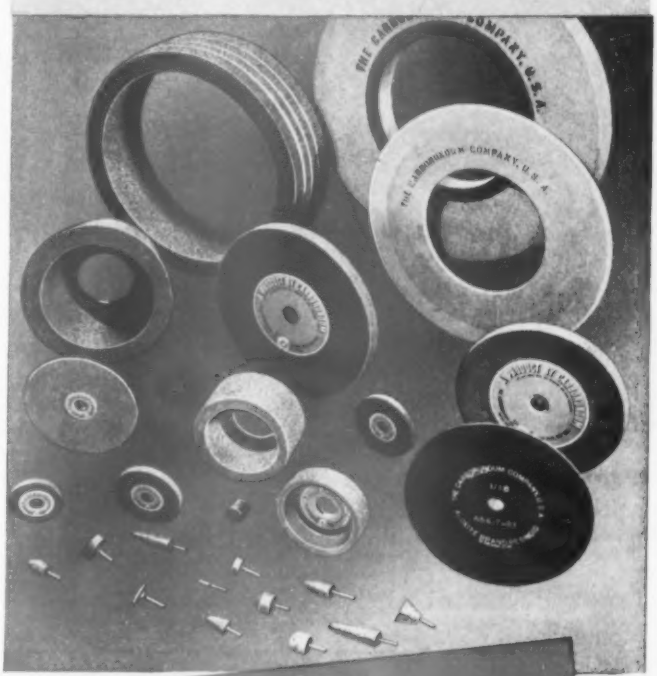
Designed for use on irregular surfaces, this sander head finishes, in seconds, jobs that usually take minutes longer by costly hand sanding or other less efficient methods. Shredded abrasive tips contact every groove and depression of contours, curves, carved and moulded surfaces... produce an excellent uniform finish which may be buffed easily as desired. It is particularly effective in blending surface irregularities and eliminating scratches, mold flash and burrs of moderate severity.

While the use of the Vonnegut sander head is new to the metal working field, it is not new in principle. For many years, it has been used successfully by the wood-working trade. Practical production experience in metal operations shows equally successful and economical results. The heads are cleaner in service, cooler-cutting, operate with less pressure and enable workers to produce better finishes with less effort. Their design and construction is simple. Loading, adjustment and operation are easy.



COATED PRODUCTS — SHEETS • ROLLS • BELTS • DISCS SPECIAL SHAPES

BONDED PRODUCTS — ABRASIVE WHEELS • STICKS, STONES AND RUBS • SPECIALTIES • SUPERFINISHING STONES • SPECIAL FORMS • ABRASIVE GRAINS AND FINISHING COMPOUNDS



FOR EVERY ABRASIVE APPLICATION
...CALL IN
CARBORUNDUM
TRADE MARK

ANOTHER DIE CAST PRODUCT MADE BETTER ON KUX DIE CASTING EQUIPMENT

YALE

AND TOWNE MANUFACTURING COMPANY

makes better locks

WITH

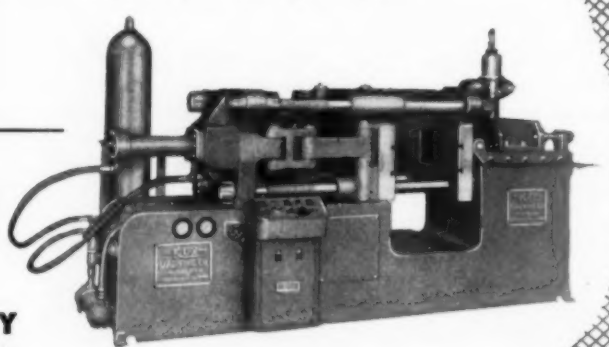
KUX

DIE CASTING MACHINES

AFTER A TWO-YEAR survey of all leading machine manufacturers, The Yale & Towne Manufacturing Company selected KUX as the line of Die Casting Machines superior to any in the country.

Now, production lines of powerful KUX Die Casting Machines, installed in Yale plants, produce their various hardware castings on a 'round-the-clock basis.

Possibly your product can be redesigned to use die castings with substantial savings in manufacturing costs. Let KUX engineers give you the answer.



MODEL BH-30 ILLUSTRATED

Hydraulically operated die casting machine for production of zinc castings weighing up to 10 pounds.

Write for illustrated catalog showing complete line of KUX Die Casting Machines.

KUX MACHINE COMPANY
3940 W. HARRISON STREET • CHICAGO 24, ILL.

Speedy handling of sand, molds and castings is very important to meet production demands. Jeffrey has the equipment — flask fillers, mold conveyors, aerators, crushers, screens, feeders — to do a complete mechanization job. It will help you broaden the profit margin all along the line. Quality equipment for quality castings.

Photo courtesy Production Foundries Division of Jackson Industries, Inc., Birmingham, Ala.

THE JEFFREY MANUFACTURING COMPANY

907 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 1 · Birmingham 3 · Boston 16 · Buffalo 2 · Chicago 1 · Cincinnati 2 · Cleveland 13 · Denver 2 · Detroit 13 · Harlan · Houston 5 · Huntington 19 · Jacksonville · Milwaukee · New York 7 · Philadelphia 3 · Pittsburgh 22 · St. Louis 3 · Salt Lake City 1 · Scranton 3

ANOTHER 3M COMPANY SERVICE STORY

HEAVY GRAY IRON CASTING ready for "snagging"—on a belt backstand grinder at Nordberg Manufacturing Company, Milwaukee, Wisconsin.

FLASHING REMOVAL OPERATION—where Abrasive belts have produced smoother finishes—proved less tiring for machine operators.

New method of grinding gray iron castings removes metal 3 to 5 times faster

Nordberg Manufacturing Company speeds heavy stock removal with new 3M Method.

"Abrasive belts used for heavy metal grinding operations will remove metal three times faster than your present method", was the conclusion of a 3M Methods Report for Nordberg Manufacturing Company, Milwaukee. Based on this recommendation—this manufacturer of heavy power equipment converted to backstand belt grinding for removing gates and risers from heavy castings.

In actual production our recommendations proved up to *five* times faster on harder metals—and up to *nine* times faster than previous methods on softer metals. Hundreds of firms throughout the country have cut production costs and saved production time in grinding and finishing metals—often by a simple conversion of existing metal finishing equipment.

Why not send today—for your free copy of "STEP UP PRODUCTION". See how a wide variety of grinding and finishing operations can quickly and economically be accomplished with industry's versatile tool—3M Coated Abrasives.

Made in U.S.A. by MINNESOTA MINING & MFG. CO., *St. Paul 6, Minn.*

Also makers of "Scotch" pressure-sensitive tapes, "Underseal", "Scotchlite", "3M" Adhesives.

☐ Please send me a copy of your booklet "Step Up Production".
☐ Please send a 3M Methods Engineer to call on me. F-849

*Name*_____

*Firm*_____

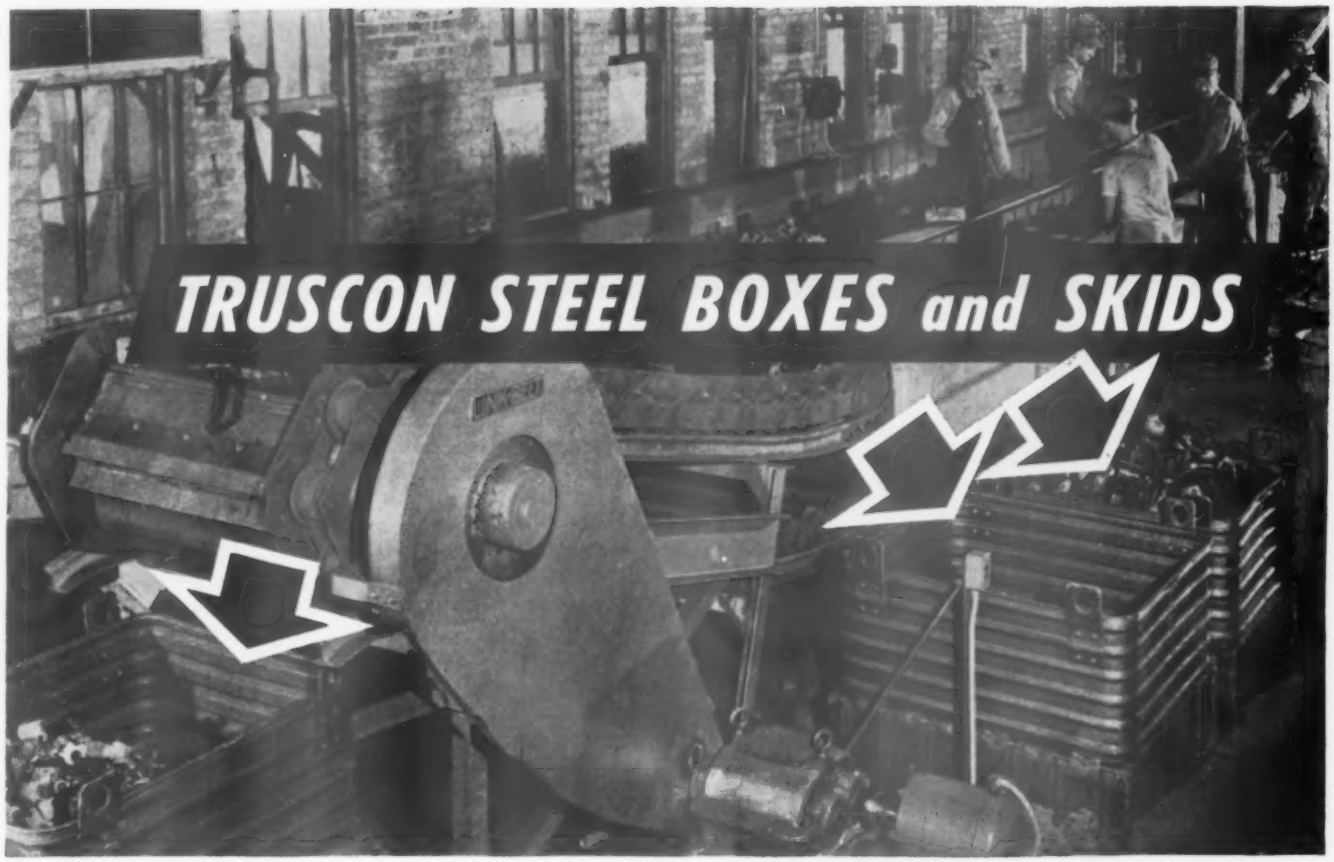
*Title*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

3M® ABRASIVE BELTS

General Export: DUREX ABRASIVES CORP., *New Rochelle, N. Y.* • *In Canada:* CANADIAN DUREX ABRASIVES LTD., *Brantford, Ontario*



help triple foundry capacity!

● Mechanization of National Sewing Machine Foundry at Belvidere, Ill., tripled its capacity without increasing floor space, according to FOUNDRY Magazine, January, 1949. Major advantages have been lower casting costs, better competitive standing, more income for molders, better working conditions.

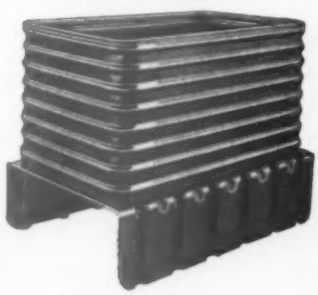
Truscon Steel Boxes and Skids are playing an important part in this profitable plant development, as indicated by the above action photo of an apron conveyor delivering castings from shake-out screen to the Truscon boxes. Ask for full information on these units.

INVESTIGATE TRUSCON STEEL FOUNDRY FLASKS, TOO

Truscon Steel Foundry Flasks are preferred for steady foundry production because they are especially designed to meet the particular requirements of light, medium and heavy castings of all kinds of metals. Correct thickness of flask walls . . . proper placing of flanges . . . types of handles and pin lugs . . . these features assure quick, economical, long-life production in your plant.

Write for illustrated catalog giving Truscon Steel Foundry Flask details that may help you increase foundry profits.

Model CH-40 Truscon Flask for Extra Heavy Duty



Type PB-120 Truscon Steel Box and Platform

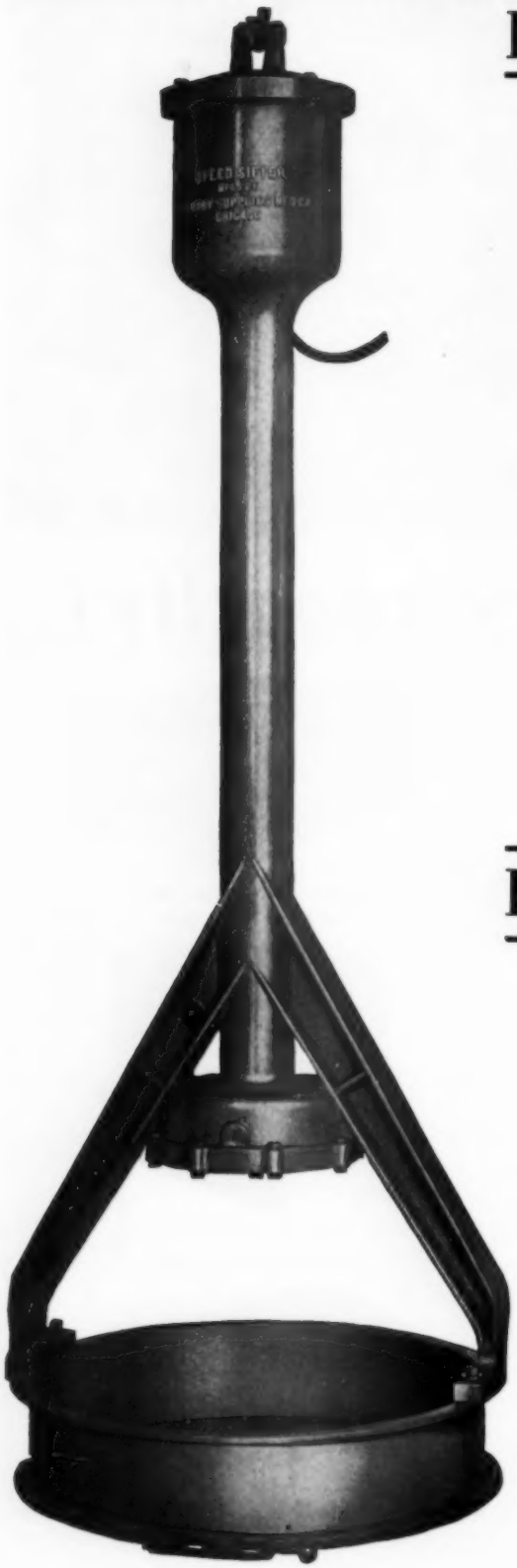
Model OM-1 Truscon Flask for One-Man Handling

TRUSCON STEEL COMPANY
PRESSED STEEL DIVISION
6100 TRUSCON AVENUE • CLEVELAND 4, OHIO
SUBSIDIARY OF REPUBLIC STEEL CORPORATION

Increase Production

with the

ROTOPLANE SPEED SIFTER ★ RED ELECTRIC VIBRATORS



ROTOPLANE SPEED SIFTER

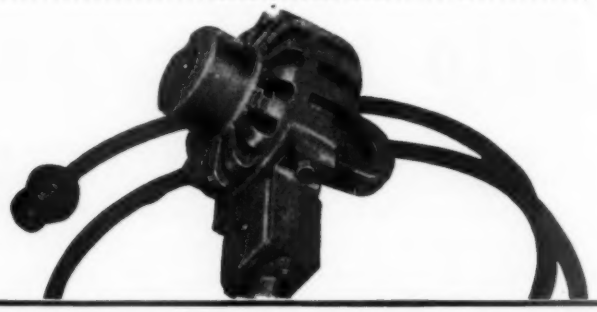
The ROTOPLANE Speed Sifter is an *improved* sand riddle of much greater capacity and much longer life. One size and type serves all purposes in the foundry—does *all* your sifting more quickly and economically.

It is easily handled by one man, weighs approx. 90 lbs., is 62 in. high overall. The one-piece frame of tough aluminum alloy makes for a remarkably effective vibration. Its smooth, free, rotary action vastly increases bearing life; all bearings grease packed. All mechanism of the ROTOPLANE is *completely* enclosed—no bearings or activating parts of any kind exposed to dust and grit.

The Quick-Change Sieves are instantly interchangeable, mounted in smooth, flat steel ferrule, with 20-inch diameter clear sifting area. No jagged edges to tear workers' hands, no storage problem.

$245.00 f.o.b. Chicago—complete with cable, safety ground wire. Standard 1/3 h. p. motor, 110 volt, 60 cycle, single phase and 220 volt, 1 or 3 phase.

UNIVERSAL FREE - WHEELING RIDDLE equipped with motor as above $225.00



RED ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$12.00
No. 2—Medium match plate work	15.60
No. 5—Heavy match plate, tub and bench work	20.40
No. 9—Machine and heavier work	28.80

Third (ground) wire per U. S. Govt. code—furnished with No. 9 at no extra cost; $1.20 extra with Nos. 1, 2 and 5 vibrators.

KNEE SWITCHES for operating Red Electric Vibrators: Single pole $5.00, Double pole $6.50.

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street **Chicago, Illinois**

CABLE ADDRESS: "ROTOPLANE CHICAGO"

ADAMS ALUMINUM
SLIP FLASK

ADAMS CHERRY
SNAP FLASK,
SPECIALLY SHAPED

Any Shape—Any Size

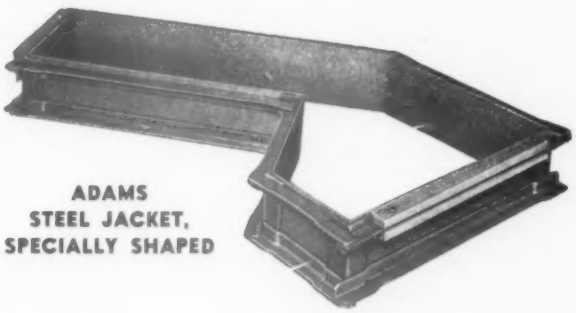
FLASKS OR FLASK EQUIPMENT

ADAMS-BUILT

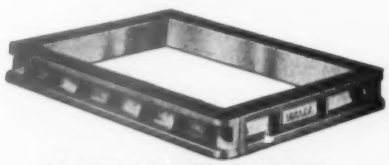
To Your Exact Specifications

ADAMS CHERRY
EASY-OFF FLASK

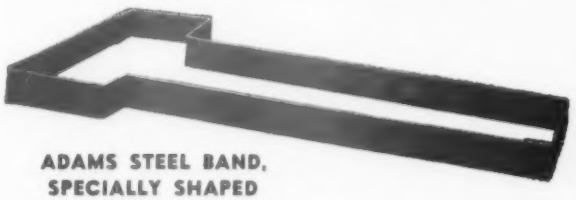
Whatever style, size or shape you need, Adams custom made Flasks and Flask Equipment are built to your order, with any desired length, width or depth, by men who *know* foundry requirements. And when they are *Adams-Built,* they assure more efficient performance, longer life and faster production. They are designed to maintain peak production of high-quality castings, reduce rejects, lower production costs. It is hard to surpass Adams Flasks for accuracy, convenience and economy. Write for complete information today.



ADAMS
STEEL JACKET,
SPECIALLY SHAPED



ADAMS ALUMINUM UPSET



ADAMS STEEL BAND,
SPECIALLY SHAPED

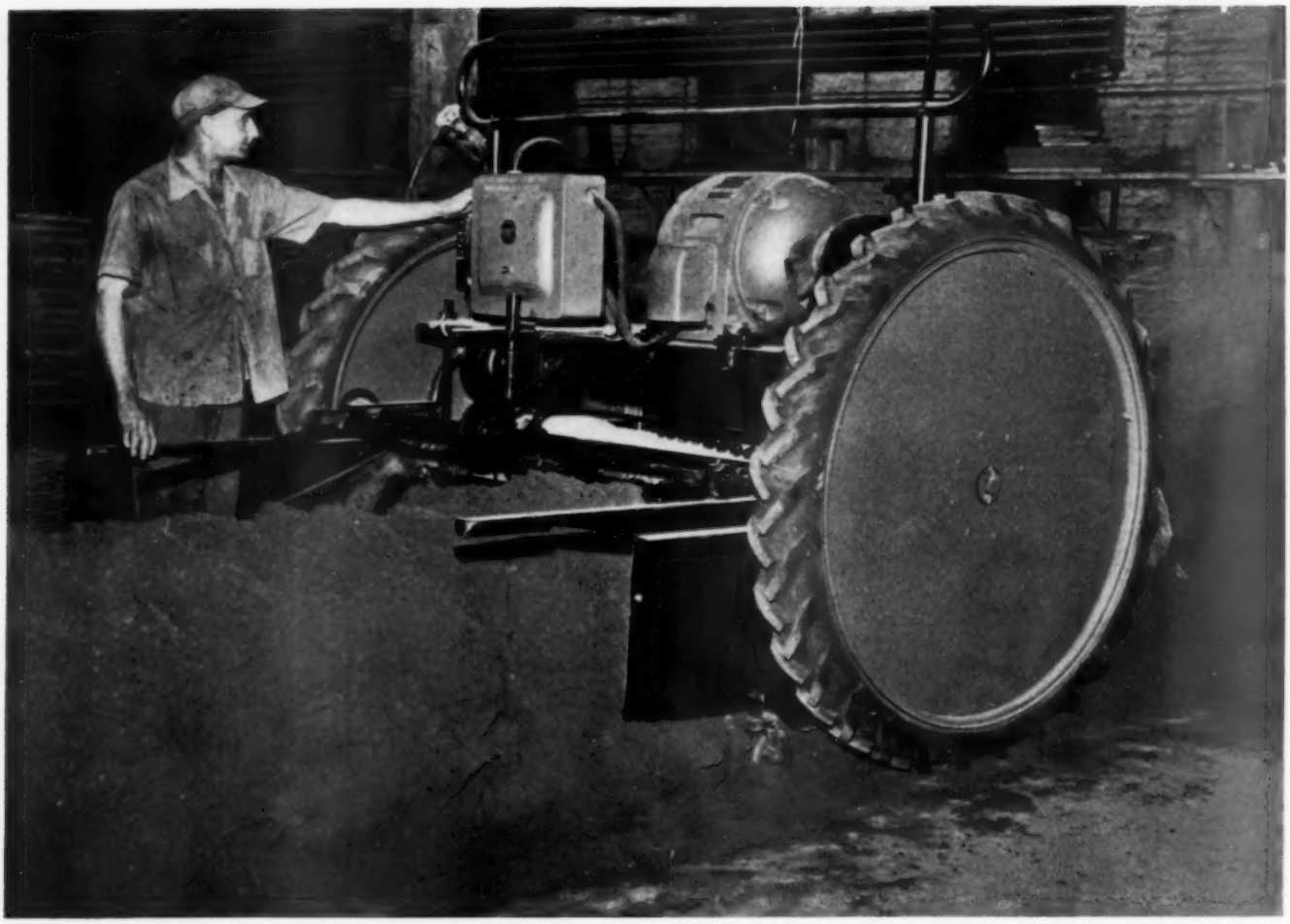
THE ADAMS COMPANY
800 FOSTER ST. DUBUQUE, IOWA

The ADAMS Company

ESTABLISHED 1853

DUBUQUE, IOWA, U.S.A.

MOLDING MACHINES and FLASK EQUIPMENT



"The Moulders' Friend" **conditioning more than two tons of sand per minute in a Pennsylvania foundry.**

"The Moulders' Friend" **Fits Your Foundry.** Carried on two large pneumatic tired wheels, it rolls easy and turns short in the crowded foundry under the complete control of one man—No experience required to operate—Saves labor shoveling.

"The Moulders' Friend" **Improves the Condition of Your Sand Heaps.** The brush does the job. Thousands of flat tempered steel wires in the brush revolving at high speed pick up small particles of the used sand, added bond and moisture and blend them thoroughly. The action is so thorough that clay bond and water can be blended with the sand in one trip over the heap.

"The Moulders' Friend" **conditions *all* the heap.** As it travels over the heap it gathers *all* of the sand from the floor, pulverizes the lumps and blends it thoroughly, avoiding the layer of dry, unconditioned sand sometimes found next to the foundry floor.

"The Moulders' Friend" **Is Easy to Buy and Maintain.** Simplicity of construction with few moving parts keeps down original and replacement costs. High speed chain drives run in dirt proof, oil tight cases.

Investigate this remarkable machine. Your neighbor has one. If you want satisfied moulders making quality castings write us now.

***"The Moulders' Friend"*, Dallas City, Ill.**

It's Here!

THE NEW NI-ROD "55" for CAST IRON welding

New core
New flux
New performance
New dependability

"55" WELDS HIGH-PHOSPHORUS CASTINGS!
Now you can lick those *tough* jobs. Ni-Rod "55"* makes satisfactory welds in cast iron containing as much as 0.65% phosphorus.

"55" WELDS HEAVY SECTIONS!
Hard to weld heavy-section jobs will be easier now with Ni-Rod "55". Improved core and improved flux give improved performance.

"55" SELDOM NEEDS PRE-HEATING!
With Ni-Rod "55" in your electrode clamp, time consuming heat-ups are rarely required.

"55" MAKES MACHINABLE WELDS!
Ni-Rod "55" gives smooth, readily-machinable weld deposits. No special cutting tools required!

"55" WELDS ARE SOUND, CRACK-FREE, NON-POROUS!
Where dependable high-strength welds are a must, Ni-Rod "55" won't let you down. Use it for repairing machine frames, working parts, cylinder blocks.

"55" GIVES A CLOSE COLOR MATCH!
If finished appearance is important, call for Ni-Rod "55". The deposit is a good match for most grades of gray iron.

"55" WELDS CAST IRON TO STEEL!
Whenever the blue print calls for assembling cast iron to steel . . . Ni-Rod "55" will do the job reliably and efficiently.

"55" WORKS ON BOTH AC AND DC!
No current problem, here. Ni-Rod "55" can be used with your present shop equipment . . . and you can use it with your portable equipment.

"55" GIVES STABLE ARC IN ALL POSITIONS!
Up, down, laterally . . . you can put Ni-Rod "55" to work in cramped quarters without fear of failures.

"55" IS EASY TO USE!
Yes . . ."easy" is the word! With Ni-Rod "55" you get easy slag removal, excellent "wash", smooth bead contour, quick strikes . . . even if you are not an expert.

Quickest way to find out more about Ni-Rod "55" is to *try it* . . . try it on those tough jobs you couldn't weld with other rods. See for yourself that Ni-Rod "55" is *all new*, and *better than ever!*

Your nearest distributor stocks Ni-Rod "55" in 3/32", 1/8", 5/32", and 3/16". Order a five-pound package today.

Send for the new folder announcing Ni-Rod "55".

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67 Wall Street, New York 5, N. Y.

*Reg. U. S. Pat. Off.

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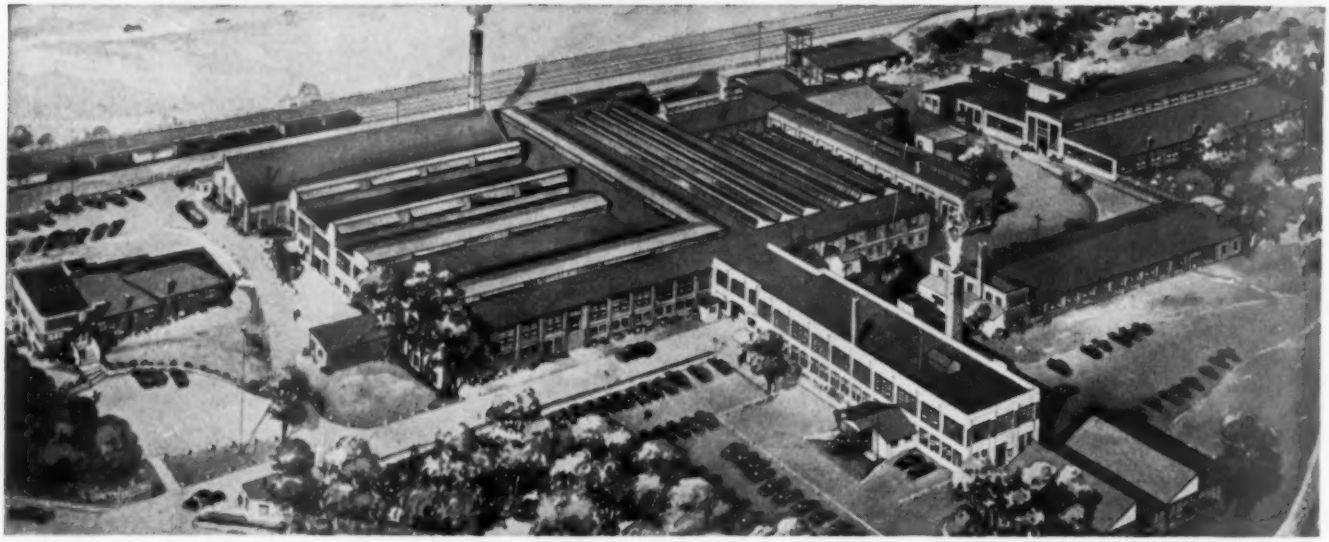
Cleveland builds security in every link!



Factory headquarters and general offices of The Cleveland Chain & Mfg. Co., and its associate, David Round & Son, Cleveland, Ohio. Similar plants are operated by associate companies in Bridgeport, Conn.; Seattle, Wash.; So. San Francisco, Cal., and Trenton, N. J.

SIX plants of The Cleveland Chain & Mfg. Co. and its associate concerns produce chain of every type . . . to meet every home, farm, automotive and industrial chain need.

History of the Cleveland organization, now in its 80th year, is typical of American industry under our free enterprise system.

David Round, company founder, learned his trade as an apprentice in his father's hand-forge chain shop in Staffordshire, England. His first chain works, established in 1869 at Newburgh (near Cleveland), was little more than an enlarged blacksmith shop.

But, Mr. Round's insistence upon master craftsmanship . . . his refusal to compromise with quality resulted in constant business growth.

Today, Cleveland Chain is sold throughout the world . . . preferred by users who demand utmost security in every link.

CLEVELAND CHAIN

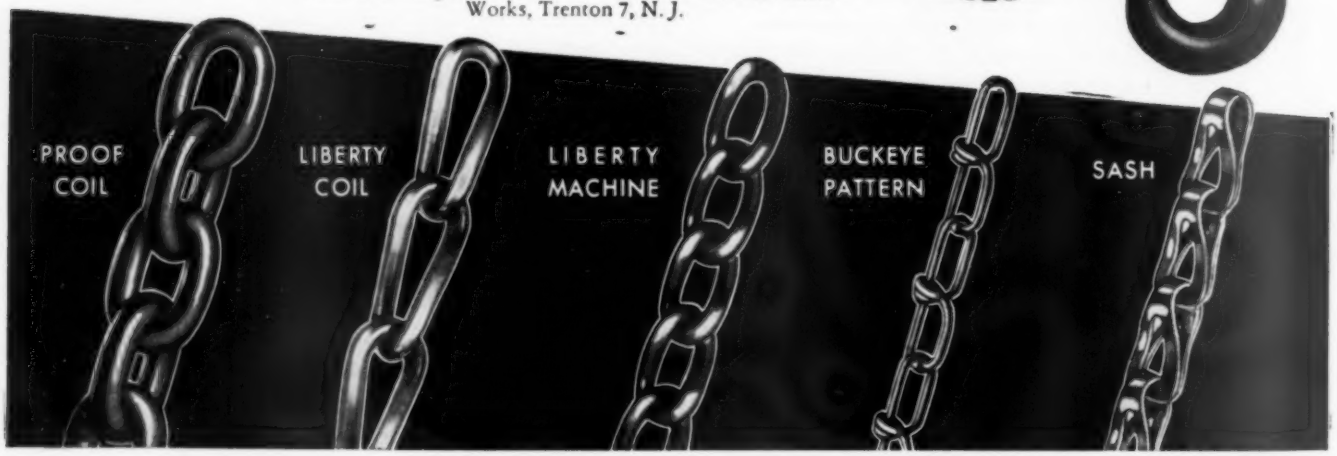
The Cleveland Chain & Mfg. Co.

Cleveland 5, Ohio

Since DR 1869

Associate Companies: David Round & Son, Cleveland 5, Ohio. • The Bridgeport Chain & Mfg. Co., Bridgeport 1, Conn. • Seattle Chain & Mfg. Co., Seattle 8, Wash. • Round California Chain Co., So. San Francisco and Los Angeles 54, California • Woodhouse Chain Works, Trenton 7, N. J.

Certified CHAIN INSTITUTE Member



HOW TO UNLOAD A BOX CAR *FAST*

Payloaders Handle

SAND
SLAG
COKE
CASTINGS
LIMESTONE
CLAY
SCRAP
SPRUES

The production of castings involves the varied handling of sand and other bulk materials. These must be unloaded, transported, stored, lifted, dumped, spread, windrowed and loaded day after day. The unloading of box cars is only one of these vital material handling jobs that seriously effect production costs.

The Model HA Payloader was designed primarily to provide a flexible and efficient method of handling these many bulk material handling jobs as encountered in the foundry. Its greater horsepower has meant full loads on every trip regardless of the materials handled. Its rear-wheel steering has meant quick turning inside box cars and within narrow aisles. Its large pneumatic tires and unusual visibility has resulted in greater speed combined with greater safety. That's why Model HA Payloaders unload box cars at rates up to 50 tons per hour under certain material and distance conditions.

Hundreds of foundries are solving their normal loose-material handling problems with PAYLOADERS, also using them for *extra* jobs such as snow removal, yard and floor clean-up, dump leveling and grading. It will pay you to get *all* the facts about the all-around performance of the PAYLOADER line — facts based on 28 years of materials handling experience. The Frank G. Hough Co., 703 Sunnyside Ave., Libertyville, Illinois.

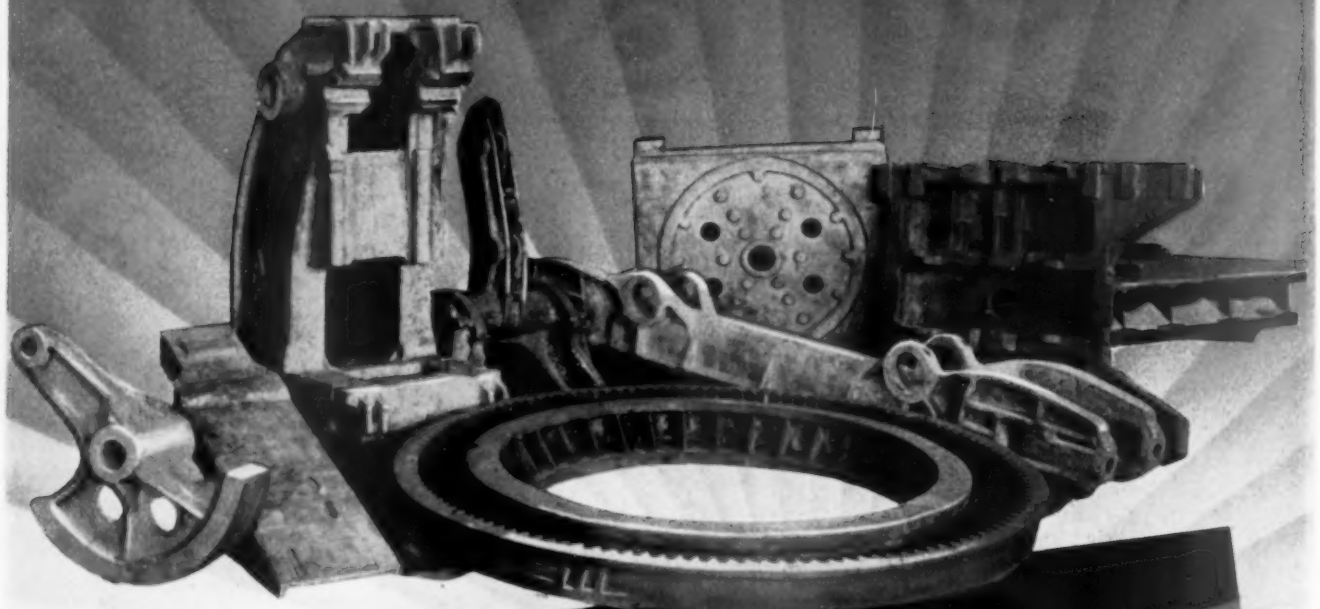
SEND FOR LITERATURE on the 10½ cu. ft. Model HA Payloader, the ¾ yd. Model HF, the 1¼ yd. Model HL or the 1½ yd. Model HM — also the 2 yd. Payloader Buggy.

SAY "HUFF"

HOUGH
PAYLOADER

Manufactured by THE FRANK G. HOUGH CO.

CUT CLEANING COSTS



With KORGLAZE

KORGLAZE pays off with a saving in cleaning room costs which one foundry reports as 25%. And there is a plus value, too. KORGLAZE will upgrade your product. Castings are smoother and cleaner, can be cast to new dimensional standards and have a built-in eye appeal that really boosts sales

Here's how it works—Mix about 2 3/4 lbs. pure talc or graphite with a gallon of KORGLAZE. Spray molds thoroughly. Air drying will do the job or a light torching will dry the surface completely, tying the graphite or talc firmly to the mold. After 5 to 8 minutes, when the surface has cooled, cores can be placed and the molds closed ready to pour.

Here's the Saving!—One foundry which turns out a 2300 lb. casting formerly made in a dry sand mold doubled their output by switching to a green sand mold with KORGLAZE—and the quality of the castings was actually improved

KORGLAZE is also used as a vehicle with graphite in coating cores to prevent metal penetration and protect a fine line of cleavage between core and casting

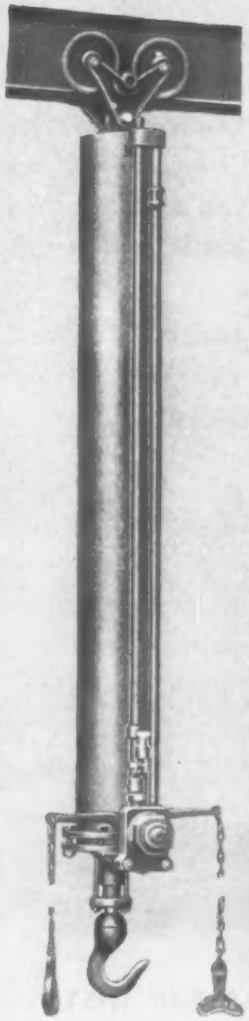
Time saved in the cleaning room means faster production and lower costs and if a smoother surface and greater dimensional accuracy are desirable, then KORGLAZE becomes a must

UNITED OIL MFG. CO.

1429 WALNUT STREET • ERIE, PA.

CURTIS AIR CYLINDERS

Increase Plant Efficiency—Decrease Production Costs



Curtis Air Cylinders for lifting, lowering, pushing or pulling GIVE YOU—

- Smooth, fast, accurate control of loads
- Capacities exceeding 10 tons
- Finger-tip control — one-man operation
- All-steel construction
- Immunity to overloads
- Low first cost, lowest operating expense
- Indoor and outdoor service

It will pay you to investigate Curtis first

95 Years of Successful Manufacturing

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☐ Air Hoists
☐ Air Cylinders
☐ Air Compressors

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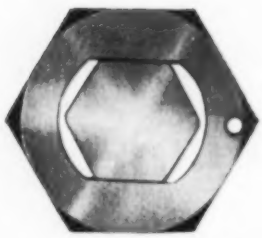
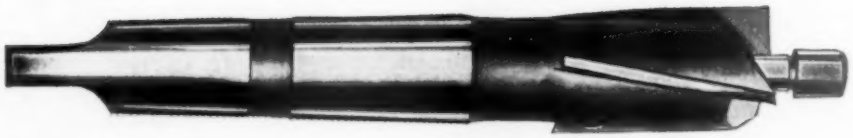


THE IMPROVED HINES PINS AND BUSHINGS

Our pins and bushings have been thoroughly re-engineered. A new factory technique is now being employed in their construction. While closer tolerance is permitted by reason of this new technique, friction between pin and bushing has been reduced almost 50%—and the pins and bushings themselves are more uniform, harder, and much better in all details. They don't rust, they don't bind, and they don't require lubrication. Extremely useful where ever good, accurate pins and bushings are required, they are just what your pattern department needs. Because they are hardened and chrome plated, they resist wear.

The original Hines pins and bushings are of our own design. They have been on the market for 25 years, and the several hundred thousand now in use are still giving good service. This wide acceptance is clear evidence of their usefulness in all foundries.



TOOLS FOR INSTALLATION
This counterboring tool and wrenches are the only tools needed for an installation of Hines Pins and Bushings.

THE HINES

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CLOSER TOLERANCE

NO BINDING

NO LUBRICANT

HEAVY CHROME PLATE

NO RUSTING

RIGIDLY INSPECTED

GUARANTEED

WRITE FOR DETAILS AND PRICES

S FLASK CO.

CLEVELAND 11, OHIO

SMITH L-O CORE OIL... Superior Quality Throughout *and* Uniformity Guaranteed

Castings that sell — and stay sold — are the result of your own painstaking preliminary steps and the use of top-grade basic materials. Quality materials like Smith L-O Core Oil.

Here is a binder superior in uniformity . . . guaranteed to be "right" — batch after batch — because of exclusive Dow-Therm processing. You will find Smith L-O mixes quickly and evenly to give excellent workability in all types of coremaking . . . is maximum fast drying at high and low temperatures . . . helps produce accurate cores with toughness and flexibility combined, thus eliminating excess breakage in handling.

A trial run with Smith L-O Core Oil will prove its adaptability to your production schedule. Available in 20 grades to suit specific classes of casting.

Smith L-O Core Oil

CORE WASH ROD DIP LIQUID PARTING

Smith L-O Core Oil

WAREHOUSE STOCKS AVAILABLE
In The Following Cities

- COLUMBIAN WAREHOUSE CO. — Reading, Pennsylvania
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- TERMINAL WAREHOUSE — Worcester 8, Massachusetts
- TOMKINS TIDEWATER TERMINAL — South Kearny, New Jersey
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- WESTERN FOUNDRY SAND CO. — Seattle, Washington
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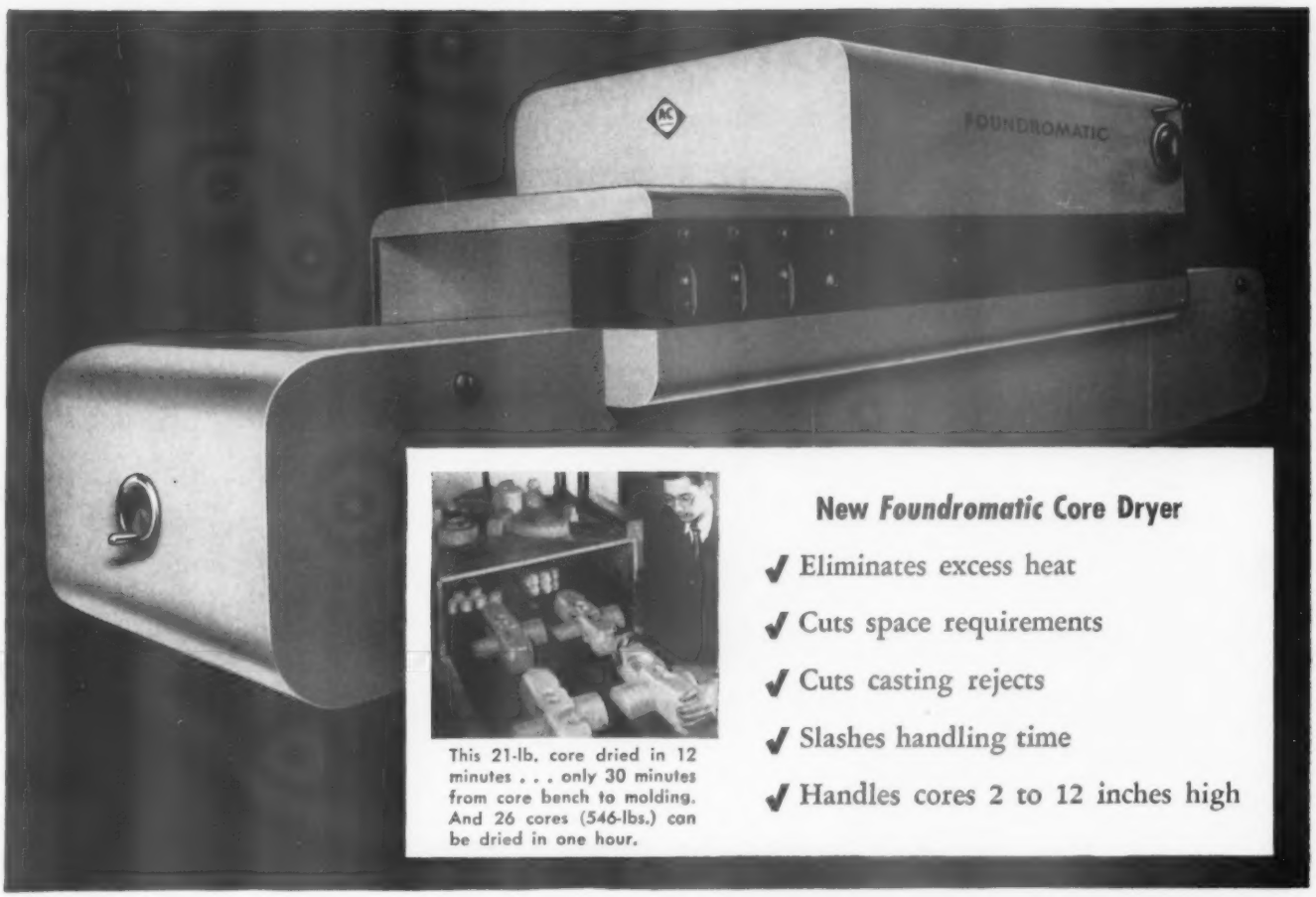
SMITH OIL & REFINING CO.
MANUFACTURERS OF L-O AND CERTIFIED CORE OILS
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

ANNOUNCING

New A-C Dielectric Core Dryer - Cuts Drying Time 80%!



This 21-lb. core dried in 12 minutes . . . only 30 minutes from core bench to molding. And 26 cores (546-lbs.) can be dried in one hour.

New *Foundromatic* Core Dryer

- ✓ Eliminates excess heat
- ✓ Cuts space requirements
- ✓ Cuts casting rejects
- ✓ Slashes handling time
- ✓ Handles cores 2 to 12 inches high

NO COOLING, curing or steam-out time is needed when cores are dried in Allis-Chalmers new dielectric sand core dryer. Cores may be handled with bare hands immediately after coming out of the dryer.

Allis-Chalmers own huge foundries were the testing ground for the new unit. A-C foundry and electronic engineers cooperated in tailoring the dryer to foundry requirements.

SEE NEW CORE DRYER OPERATE

Visit Allis-Chalmers foundries and see the new unit in operation. Arrange with your nearby A-C representative, or write direct to Electronics Section, Milwaukee. See at first hand the savings possible in space, time and handling with the new core dryer.

Foundromatic is an Allis-Chalmers trademark.

ALLIS-CHALMERS

SEND FOR DETAILS!

ALLIS-CHALMERS, 1032A SO. 70 ST.
MILWAUKEE, WIS.

Send me information on new Foundromatic Sand Core Dryer.

Name.....

Title.....

Company.....

Street.....

City.....

State.....

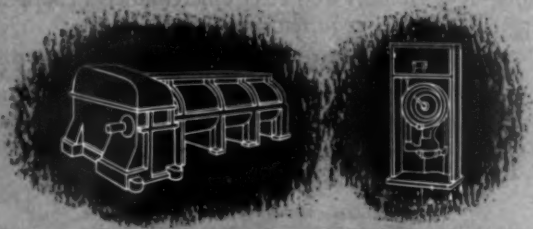
A-2781

better core sand means fewer rejects

Baker Perkins Unidor core Sand mixer

Consistently better castings with reduced spoilage is the result of preparing core sand in a Baker Perkins "Unidor" Core Sand Mixer. The "Unidor" Mixer rubs, stirs and kneads sand all in one operation without need for aerating attachments. A thin layer of bond is distributed uniformly *around each grain of sand,* resulting in 100% benefit from bonds, binders, oils or other compounds used. Sand grains are not broken up, leaving it with a high degree of permeability. Extremely low maintenance required. Available in laboratory and batch-type sizes, up to 25 cu. ft.

Other Baker Perkins foundry equipment, includes Liquid Meters which *automatically and accurately control the flow* of binder oil or water into the mixer, and Baker Perkins Continuous Sand Mullers which are available in 30, 40, 60 and 120-ton-per-hour capacities.

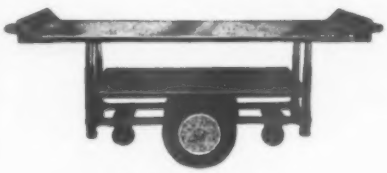


Baker Perkins SAGINAW, MICHIGAN • FOUNDRY EQUIPMENT SALES

BAKER PERKINS BUILDS EFFICIENT FOUNDRY EQUIPMENT

MODEL A-27, shown here in use in a large electrical manufacturing plant, is ideal for carrying the heaviest loads. Heavy duty elliptical springs and inner coil springs in the upright supports, quickly absorb shocks and bumps. Timken roller bearing disc wheels with pneumatic tires. Three sizes: 27″ x 60″, 800 lbs capacity; 27″ x 72″, 1,000 lbs capacity; and 27″ x 84″, 1,200 lbs capacity.

Cores Ride with *"Feather-Bed"* Ease ON CMD PNEUMATIC CORE TRUCKS



MODEL D-1

This moderately-priced truck features an auxiliary loading tray for extra convenience. Both loading trays are heavy sheet steel. CMD inner coil springs and pneumatic tire wheels make Model D-1 a real value. Load capacity is 500 lbs.

Reduce core damage costs as much as 50 to 75 per cent by transporting cores on shockproof CMD Pneumatic Core Trucks. These trucks, with their exclusive inner coil spring construction in the upright supports, and their pneumatic tires, absorb all bumps and jars *before* they reach the cores and cause chafing or breaking. Since 1925, foundries have relied on CMD Core Trucks for fast, safe handling and delivering of cores from the core room to the foundry.

Write today for FREE circular on CMD Core Trucks and other foundry specialties.

CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 8F, 1928 West 46th Street **Chicago 9, Illinois**

STERL

WHERE CAREFULLY CONTROLLED
CONTRIBUTE THEIR SHARE TO

Large wheels, small wheels, segments, bricks and sticks — all take their proper proportion of humidity and heat before the application of other manufacturing processes. The careful selection of suitable conditions under which the "Wheels of Industry" are made is one of the major functions of Sterling's New Research and Development Program.

No less important are the many other features which identify Sterling's investigating, creative, manufacturing, and delivery functions. Developed through many years, they are now an integral part of a service that is providing the finest grinding wheels obtainable anywhere.

Users of Sterling Grinding Wheels these days enjoy many advantages that are now a normal part of our service. Tested under all types of industrial conditions, Sterling Abrasives are solving unusual problems for grinding foremen everywhere . . . can do it for you! May we show you how readily Sterling's New Research and Development Program can be economically applied to your needs?

STERLING RESEARCH AND DEVELOPMENT IN ACTION

FIRST STEP. The Sterling engineer obtains, for basic analysis, a sample chrome weld from the grinding machine operator.

SECOND STEP. In the Sterling laboratory, the hardness of the sample's welded surface is tested and wheel calculations made.

THIRD STEP. The test wheel, made under strict control, represents the recommendations of five or more Sterling technicians.

FOURTH STEP. On the job, where results count, the new wheel lives up to the demands of the weld-grinding job. Research pays!

THE STERLING GRINDING WHEEL DIVISION
of
THE CLEVELAND QUARRIES CO.
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Since 1885, Manufacturers of "The Wheels of Industry"

Branches: Boston, Chicago, Cleveland, Detroit, Los Angeles, Philadelphia, New York. Distributors In All Cities.

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HEAT AND HUMIDITY
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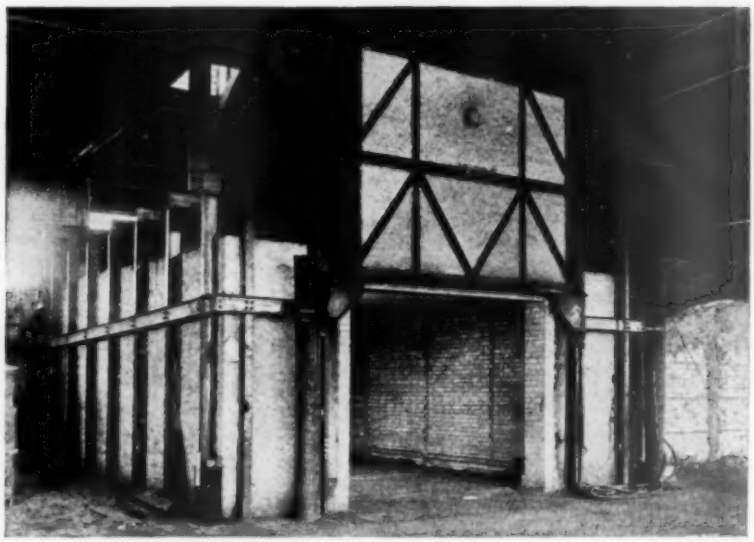
STERLING PRODUCT DEVELOPMENT TECHNIQUE

Carefully controlled schedules in the drying rooms assure quality grinding wheels and quick delivery dates. Watching every step during the processing of Sterling Grinding Wheels is one means of making certain the specification you order is delivered within precise limits for better, faster grinding.

"THE WHEELS OF INDUSTRY"
STERLING
GRINDING WHEELS

I. F. B.* will *Reduce Your Annealing Costs*



A. P. Green Insulating Firebrick used in this 15' x 23' pulverized coal fired annealing furnace. LOWER FUEL COST—FASTER ANNEALING CYCLES—CLOSER TEMPERATURE CONTROL is obtained through the use of insulating firebrick regardless of the fuel used.

*A.P.Green** Insulating Firebrick

LOWER FUEL COSTS

Low heat conductivity and low heat capacity of A. P. Green Insulating Firebrick make them exceptionally well suited for use in malleable annealing furnaces. Because of these properties, heat loss through the furnace walls is considerably reduced. These heat-confining brick make it possible to reach "heat peak" with less fuel—resulting in a material SAVING for you.

FASTER ANNEALING CYCLE

A. P. Green Insulating Firebrick's high insulating and quick heating properties enable your annealing furnace to reach the required temperature in a shorter period of time. Result—faster annealing cycle—INCREASED PRODUCTION.

CLOSER TEMPERATURE CONTROL

The quality of your annealed castings is affected by the degree of control you have over furnace temperatures. A. P. Green Insulating Firebrick keep the heat where it belongs—less variation is encountered—you can be sure of consistent temperatures. Closer temperature regulation is possible.

This temperature control results in HIGHER QUALITY CASTINGS—FEWER rejected units—all of which means SAVINGS in time and materials.

SPECIAL SHAPES

Special sizes and intricate shapes made in I. F. B. quality can be furnished to meet your specifications. Shipments made promptly.

KAST-O-LITE . . .
Insulating Castable Refractory

Frequently, this "many-purpose" castable is used in conjunction with insulating firebrick in annealing furnace linings. KAST-O-LITE has essentially the same properties as A. P. Green Insulating Firebrick and is of particular value for flat suspended arches and under-floor insulation.

KAST-O-LITE is also used as a complete lining for many furnaces where a castable insulating refractory is preferred.

Write today for FREE Booklets giving full information on A. P. Green Insulating Firebrick and KAST-O-LITE insulating castable refractory.

Address your inquiry to:

A. P. GREEN FIRE BRICK COMPANY
MEXICO, MISSOURI, U. S. A.

A. P. Green REFRACTORY PRODUCTS

District sales offices and distributors with warehouse stocks in the principal cities of the world. In Canada, A. P. Green, Ltd., Toronto.

A. P. GREEN FIRE BRICK CO., Mexico, Mo., U. S. A.

TOUGH GOING! *But Texrope V-Belts Take Foundry Work in Stride!*

GRITTY SAND . . . HEAT . . . SHOCK LOADS all combine to make this foundry breaker belt conveyor drive a tough assignment! But *Texrope* Super-7 V-belts on *Texrope* sheaves in this foundry are giving reliable, economical service.

Tough double covers stand up in foundry atmosphere full of abrasive dust. Specially selected rubber compounds are highly resistant to foundry heat and shock. Powerful structure of high tensile strength cord carries the load.

Why TEXROPE is the Greatest Name in V-Belt Drives!

Texrope originated the multiple V-belt drive for industry and more *Texrope* multiple V-drives have been installed than any other kind. Today, *Texrope* gives you everything you need in V-belt drive equipment . . . Super-7 belts . . . fixed and variable speed sheaves . . . and speed changers.

Send For Pre-Engineered Drive Manual

Vast *Texrope* experience has been condensed into a 144 page book that enables you to engineer 90% of all V-belt drives yourself. See your Allis-Chalmers Authorized Dealer or Sales Office or write for Bulletin 20B6956.

Texrope Super 7 V-belts result from the cooperative research of the Allis-Chalmers and B. F. Goodrich companies; and are sold only by Allis-Chalmers dealers and offices. A-2776

ALLIS-CHALMERS, 1032A SO. 70 ST. MILWAUKEE, WIS.

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Foundry Equipment for Bigger Output-Better Working Conditions!

CP Hi-Speed Electric Saws
—with reserve cutting power

Helical gearing, high blade speed, an extremely high powered motor, unusually rugged construction insure the necessary power to make fast, deep cuts in hard wood. Gearing requires only occasional lubrication and no special lubricants. Lifetime bearings are self-lubricating.

Made in three sizes: 7½", 8¼" and 9½" blades.

Outstanding features include 55° of bevel adjustment, 10° more than any other saw; easy adjustment of depth of cut from zero to 2 7/16" on the 7½" blade, 2 13/16" on the 8¼" blade, and 3¼" on the 9½" blade.

Special blades can be furnished for cutting through nails, copper, brass, bronze, lead, tile, glass, brick, clay products, concrete, marble, flagstone, asbestos, cement products and composition board.

For complete information write for Bulletin 3000.

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SIMONDS
ABRASIVE CO.
PHILADELPHIA, PA.

Grinding Wheels

Try this on your disc grinder

For economical grinding at fast production rate, use Simonds nut-inserted or bolt-inserted disc wheels. Easy to mount . . . expressly made for use with disc grinders such as Besly, Gardner, Hanchett and similar machines.

This specialized application of grinding wheels typifies Simonds Abrasive Company's service to industry. . . a service backed by a complete line of grinding wheels for *every* operation . . . from rough snagging castings and billets in foundries and steel mills to finishing a wide variety of parts in the metal working industries.

Our free Data Book lists specific recommendations and name of distributor ready to serve you. Write.

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Taylor Sillimanite
for Detroit Electric Furnaces...

Linings for furnaces with conical shells are fitted to gauge. Assembled and match marked before shipment, Taylor-made Linings may be installed with minimum delay.

DETROIT ELECTRIC FURNACES which are lined with Taylor SILLIMANITE Brick and Special Shapes are setting new records for long, efficient operation and lower refractory costs per ton of metal poured. Lining life may be increased by intelligent patching with one of the Taylor SILLIMANITE Patches and Cements which have been "engineered" for this job.

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For Sound Castings

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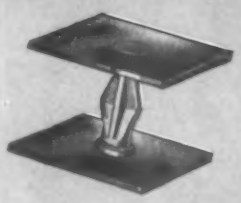

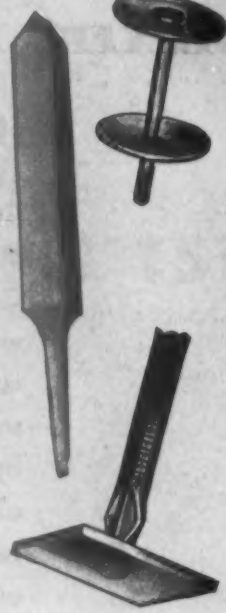

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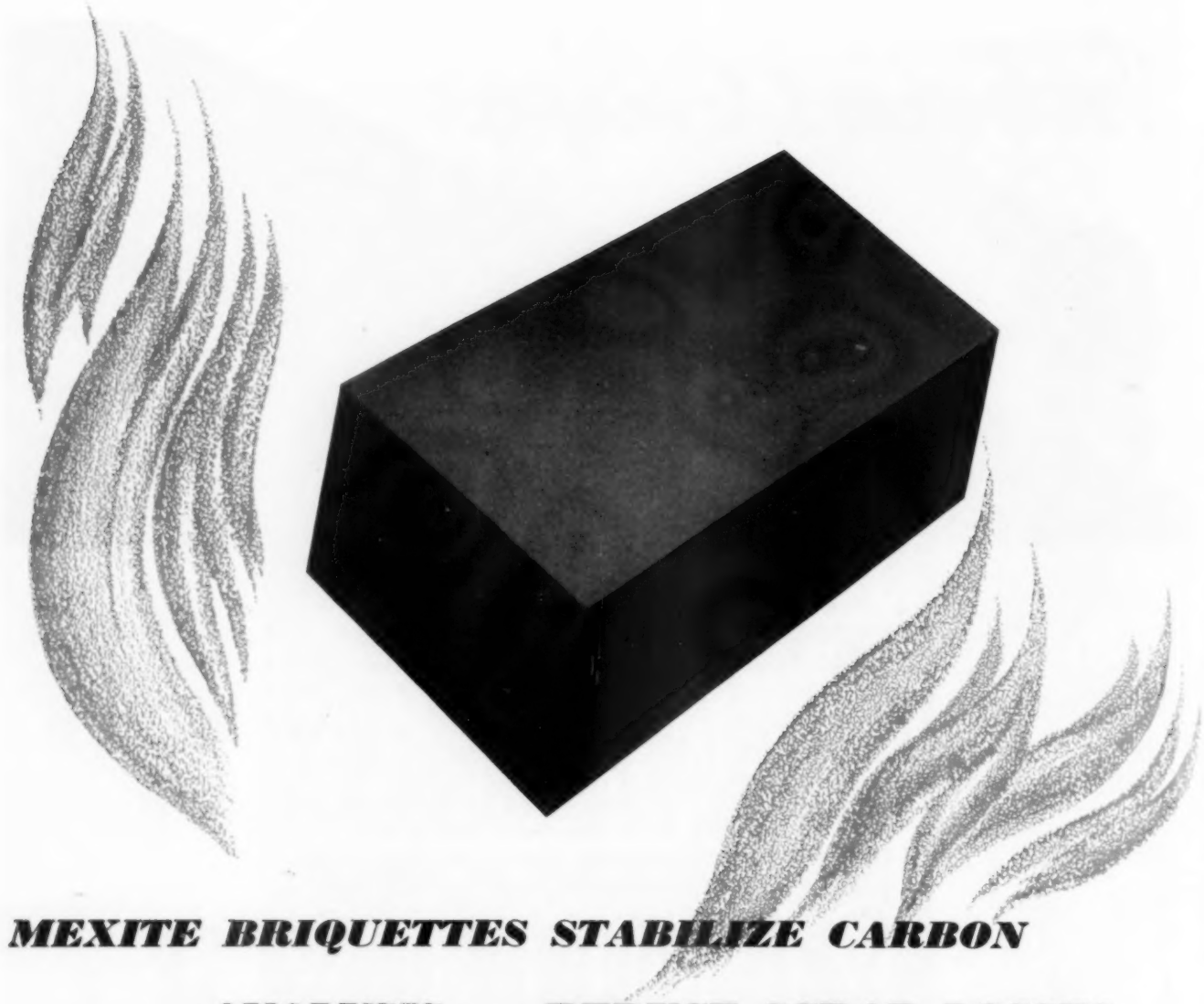

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Foundry Capacity Grows But Plants Are Fewer

PUBLICATION of Penton's Foundry List every two years gives foundry statisticians interesting data on the condition of the industry, as measured by the number of plants and geographical distribution in the various branches. The latest study, presented on page 87, shows a reversal in trend for the first time since 1941, but the margin of change is much smaller than might have been expected in the face of a decline in orders for castings which has extended over the past ten months.

War and postwar demands have the habit of influencing trends in the total number of foundries. Compilations from Penton's Foundry List show that from 1916 until 1922, the number of foundries in the United States and Canada increased rapidly. A decline, which first became apparent in the 1924 survey, carried through the remainder of the twenties, and was accelerated during the depression of the thirties. This trend was reversed just prior to the study made in 1941 and from that time until the peak, reported in 1947, a remarkable gain of 760 foundries was recorded.

Since 1916, tremendously large foundries have been built, much of the industry has been mechanized to some degree, and new machines and methods have been developed to increase the production of most foundries. In the face of this substantial increase in capacity it is interesting to note that today there are only 316 fewer foundries in the United States and Canada than were in operation 33 years ago.

What will be the trend in the number of foundries in operation during the next two years? If the predictions of numerous leading economists are correct, and the present softness in business is of relatively short duration, the industry can prevent any further decrease in number of foundries.

To provide orders for these plants, the industry needs to produce better castings, to produce them more economically, and to indulge in better and more intelligent sales efforts.

If individual foundries and the various organized divisions of the industry spent as much time, effort and money in promoting castings as manufacturers of competing products devote to their materials, many new uses of castings could be developed.

Frank G. Steinebach
Editor

THE FOUNDRY
WHEREVER METALS ARE CAST

Insulation of Risers FOR FERROUS C

This report describes experiments conducted with an inexpensive method of insulating risers on iron and steel castings in order to obtain a higher yield. The insulating material, a mixture of 40 per cent by weight of sawdust with 26 per cent dextrine and 34 per cent water, is pressed into the desired shapes, dried, coated with a refractory wash, and molded in position upon a pattern to form a riser cavity. A series of steel and cast-iron cubes of various sizes were cast with insulated and uninsulated risers to compare feeding efficiencies. When insulated risers are employed, the risers can be reduced in volume by at least 50 per cent. This riser insulating method has these disadvantages: (1) it produces a segregated area of high carbon content in the casting, (2) it causes boiling or spattering of the metal in the riser unless precautions are taken to keep the insulation dry and (3) the amount of gases discharged to the foundry atmosphere is excessive.

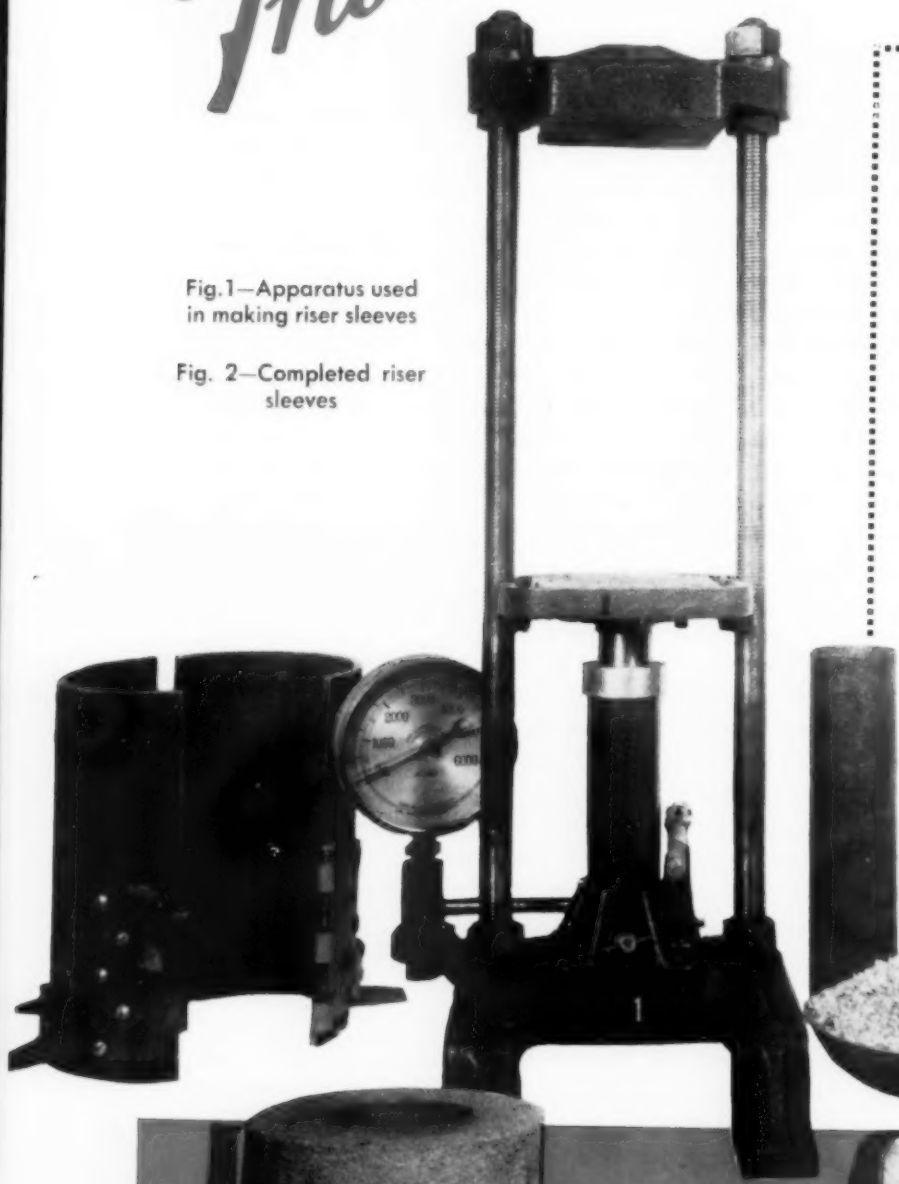


Fig. 1—Apparatus used in making riser sleeves

Fig. 2—Completed riser sleeves

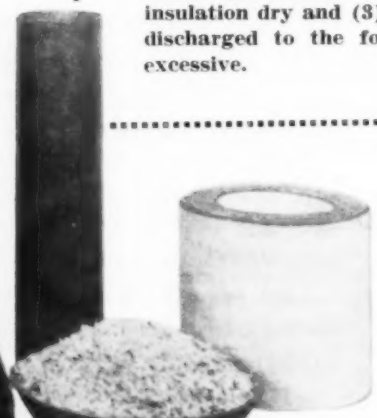
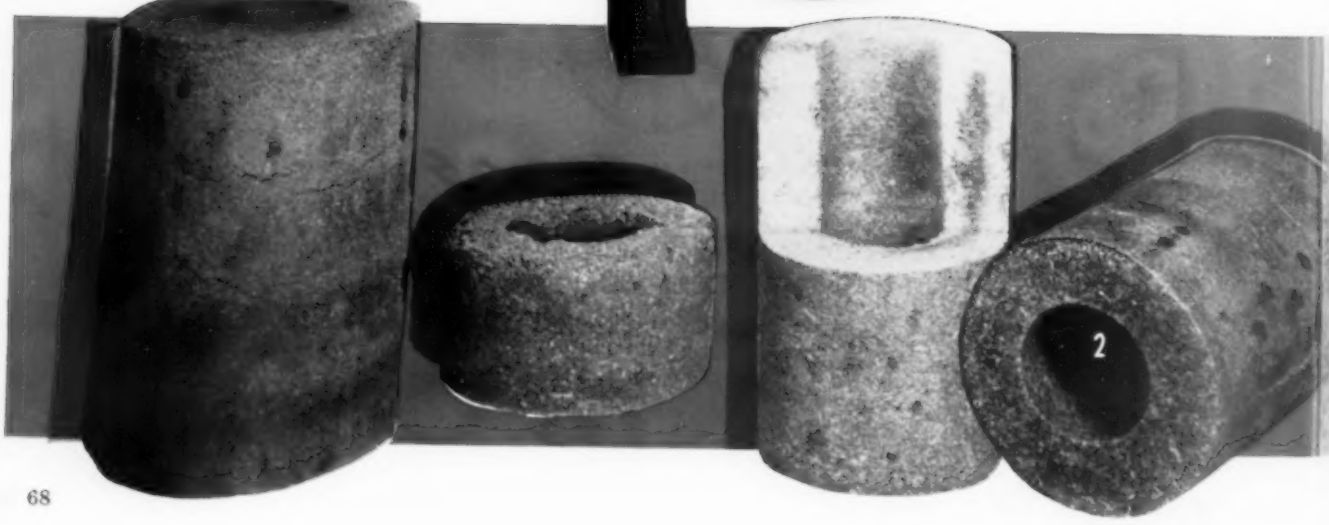


Fig. 3 — Riser sleeve with bottom cores

Fig. 4—T-block test pattern



By JAMES R. POWER

SCASTINGS

IN CURRENT steel foundry practice, only about 50 per cent of the poured metal produces usable castings. The remainder consists of gates and risers and must be removed and remelted as scrap. Risers, to function properly, should remain molten until after the casting becomes solid and therefore, in normal sand-molding practice, must be larger in diameter than the section which they feed. The purpose of this study was to develop an insulating material and method of application which would decrease the speed of cooling of the riser in respect to that of the casting, thereby permitting the use of smaller risers and increasing casting yields.

Taylor and Wick[1] have shown that the efficiency of nonferrous risers can be improved greatly by surrounding them with gypsum which is a good insulator. They demonstrated that when gypsum riser sleeves are used, risers often can be reduced to 25 per cent of the weight which would be necessary in normal practice. Furthermore, when gypsum insulation is used, cleaning costs can be reduced by decreasing the riser-contact area. Gypsum cannot be used with ferrous metals because reaction between the sulphur in the gypsum and the iron impairs the properties of the latter.

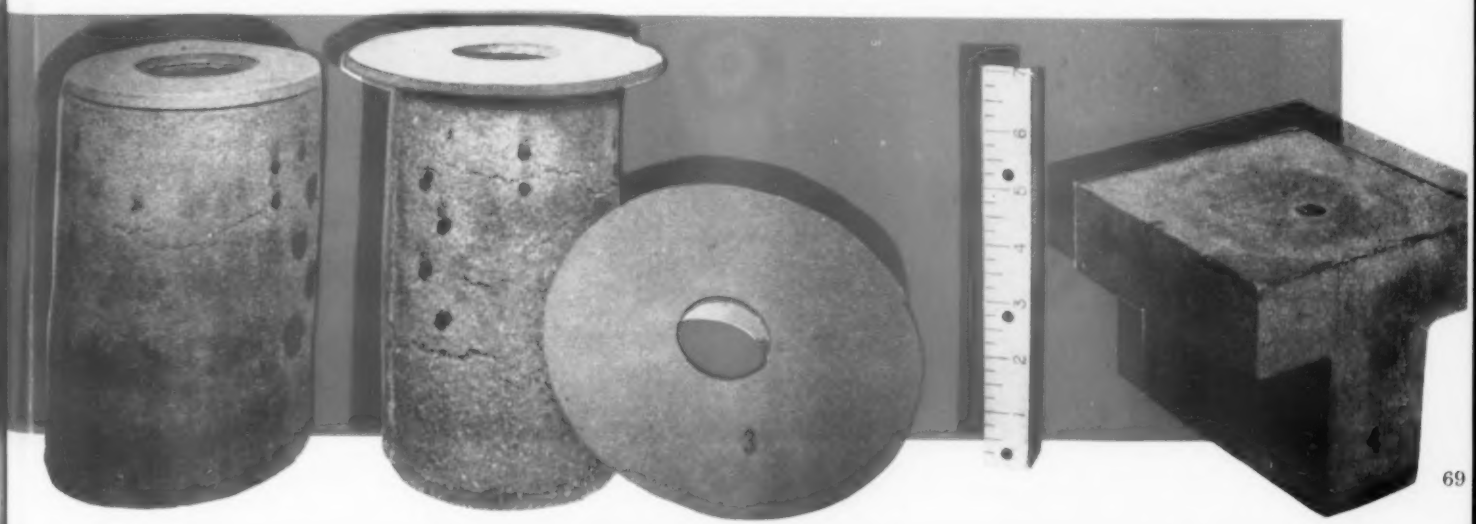
A British paper[2] described experimental work with riser insulators which contained various combinations of sawdust, fireclay, coal dust, aluminum powder, straw and sand. Only slight increases in casting yields were obtained and the prepared insulation was too weak to be rammed in place in sand molds.

While powdered materials are now commonly added to prevent premature freezing of riser tops, this insulating effect is limited by the relatively small area affected. The only other compound known to the author, which has been developed to insulate the lateral surface of risers, is a proprietary exothermic mixture which can be molded into desired shapes.

A number of commercial insulating and refractory materials were given preliminary tests as riser insulators by forming them into cylindrical shapes and using them on gray iron block castings. None of the materials proved completely satisfactory. A sleeve made of pea-size pieces of diatomaceous earth, bonded with bentonite and water, was fragile and had only slight insulative properties. Asbestos mixed with various binders such as bentonite, cement, and molasses water was also tried, but when it was packed sufficiently hard to be handled without breaking, it did not act as an insulator. A gypsum sleeve, separated from the molten metal by a $\frac{3}{8}$-in. sand core was unsatisfactory, because the gypsum became hot enough to decompose. A sleeve containing expanded mica fused at the temperatures of the molten metal. Ground fire-brick and bentonite had only mild insulative qualities. Sawdust, mixed with various binders showed the best insulating qualities, but burned and permitted metal penetration.

Although it is probable that several of these materials could have been perfected as a suitable riser insulator with sufficient experimentation, sawdust was chosen as the base material for further work because it showed the most promise as an insulator and because it is cheap and plentiful. Foundries which have pattern shops have access to a supply of sawdust at no cost. The most satisfactory mixture contained three pounds of sawdust, two pounds of dextrine and 2.6 pounds (1.25 quarts) of water. It was mulled, formed into a sleeve, and dried in a core oven. This weight of mixture will make a sleeve of 6-in. outside and 3-in. inside diameter about $7\frac{1}{2}$-in. high. Fig. 1 is a photograph of the equipment used to make the sleeves shown in Fig. 2. Two methods of fabricating these insulating sleeves are as follows:

Method No. 1: The mulled material is packed between a metal tube and a split tube of larger diameter; a ram in the form of an annular ring is set on top of the mixture; the unit is then placed in the small hydraulic press shown in Fig. 1 and a pressure to



200 psi is applied through the ram.

Method No. 2: A layer of the mulled material, several inches in thickness, is placed between the inner and outer metal tubes and hand rammed; this cycle is repeated until a sleeve of desired height is obtained. Although steel tubing was used for work in this report, wood or cement forms may be employed.

Immediately after forming, the sleeve has sufficient green strength to be removed from the tubes. It then is dried in an oven at 250 to 325° F for four hours and while it is still hot, coated on the inside with a silica wash. The bottom also must be coated with this wash, or preferably, a thin oil-sand core is pasted on this end. The opening in this core may be reduced as shown in Fig. 3 to make a "knock-off" riser.

The sleeve is placed in the desired position on the pattern, and molding sand then is rammed around it. Sand adjacent to the sleeve may be rammed either pneumatically or by hand to any reasonable hardness without danger of cracking or crushing the sleeve. When the casting is poured, and the sleeve becomes heated, the sawdust chars and sinters leaving a weak residue of charcoal and ash. The residue of the insulating sleeve does not contaminate the sand to a detrimental degree. (Steel castings having satisfactory surfaces were obtained from molds faced with a mixture of equal volumes of sand and insulating sleeve residue.) The sleeves are sufficiently permeable to allow the large volume of gases generated to escape to the foundry atmosphere. However, moisture can be absorbed by the sleeves from very humid atmospheres or prolonged contact with green sand molds thereby causing the molten metal to boil and erupt from the riser cavity.

The small T-shaped block of approximately 65-cu in. volume shown in Fig. 4 was chosen to test the effect of insulating sleeves on risers for both gray-iron and steel castings.

The first test castings were made of high-shrinkage gray cast iron of the following analysis: Carbon 2.40 per cent, silicon 1.60 per cent, manganese 0.45 per cent, phosphorus 0.150 per cent, and suphur 0.019 per cent. Cross sections of two castings poured simultaneously through one downgate from the same ladle of iron are shown in Fig. 5. The casting on the left had a riser 2½-in. in diameter by 4-in. high encased in insulating material, while the casting on the right had a normal sand-surrounded riser of the same dimension. Both risers were treated with a graphitic anti-pipe compound in the same manner to help keep the riser metal molten. Only the insulated riser remained molten long enough to feed its casting completely.

A similar pair of test blocks was then poured of a Navy Grade-B-type steel at 2900° F and again both risers were treated with anti-pipe compound. In Fig. 7, the sound casting on the left had an insulating sleeve around its riser, whereas the unsound casting on the right had a normal riser of the same initial dimensions. There was an undersirable amount of penetration of metal into the insulating material and this was reduced greatly in succeeding tests by adding fireclay to the silica wash. It was found that the inner surface of the sleeve must be covered completely with a refractory coating at least 1/16-in. thick to mini-

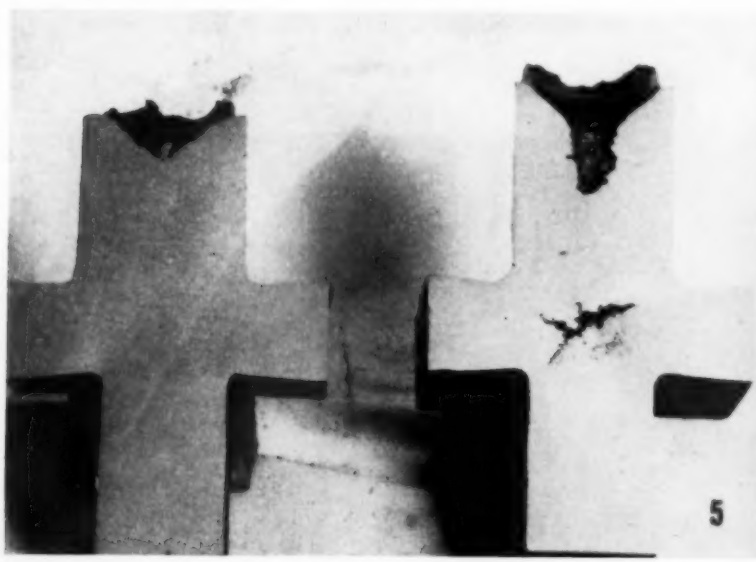
Fig. 5—Gray iron test castings: Casting on left made with insulater riser; casting on right made with uninsulated riser

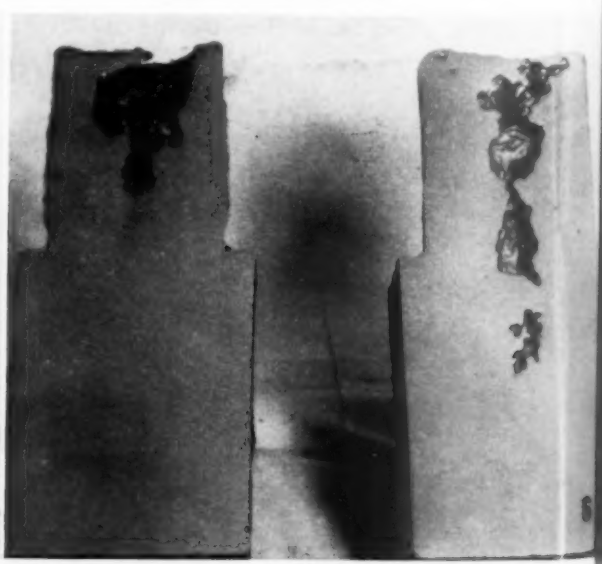
Fig. 6—Steel test castings: Insulated riser used on casting at left, uninsulated riser on casting at right

TABLE 1

Casting Dimension (Rectangular)	Casting Volume	Insulated Riser (Cylindrical) Diam	Height	Vol	Minimum Sand Riser* (Cylindrical) Diam	Height	Vol	Percent Reduction
4" x 4" x 5"	80 in.³	3"	3½"	24.8 in.³	4.6"	3"	49.8 in.³	50
5" x 5" x 5"	125 in.³	3"	5½"	39 in.³	5.75"	3"	77.4 in.³	50
5.3" x 5.3" x 5.3"	150 in.³	3"	5½"	39 in.³	6.1"	3.25"	95 in.³	59
6" x 6" x 6"	216 in.³	4"	5"	63 in.³	6.9"	3.75"	140 in.³	55

* Calculated from formulas given in Reference 3.





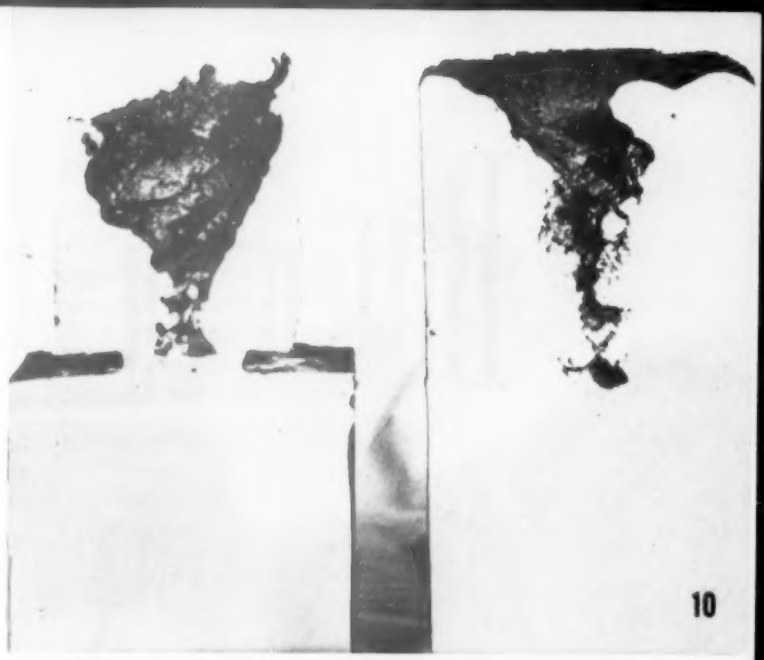
mize penetration by molten steel. The wash giving the best results contained, by per cent, 6.25 fireclay, 57.0 silica flour, 1.25 bentonite, 2.5 dextrine and 33.0 water.

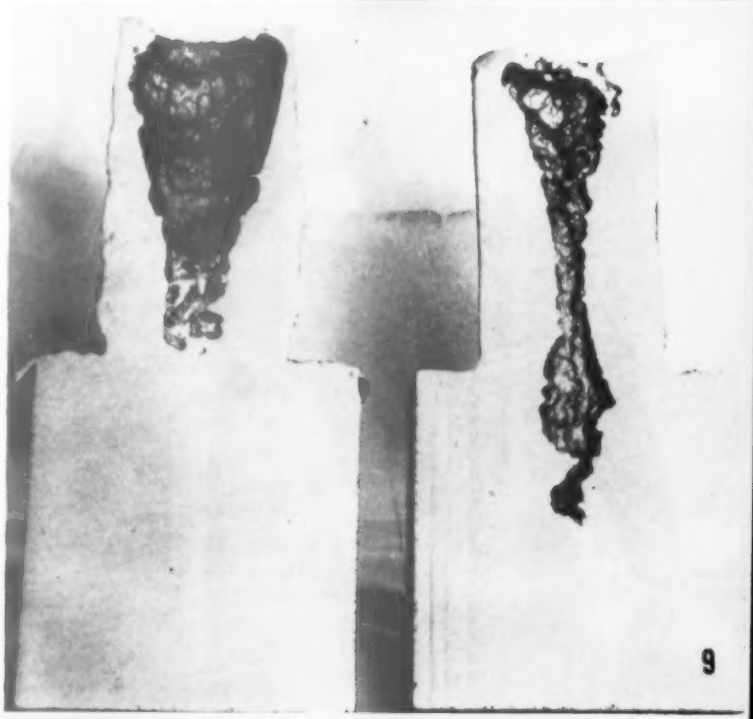
To obtain more quantitative data on the feeding efficiency of insulated risers on steel castings, a series of varying size rectangular blocks were poured. The first castings of this series were 4 x 4 x 5 in. Again two blocks were made in a single mold, gated at the parting line from a common downsprue, with risers of equal size enclosed in sand and a sawdust sleeve, respectively. The risers were located on the 4-in. square face and were 3 in. in diameter and 3½ in. high. In Fig. 6 the casting on the left was fed adequately by the insulated riser whereas the casting on the right with an (*Please turn to page* 230)

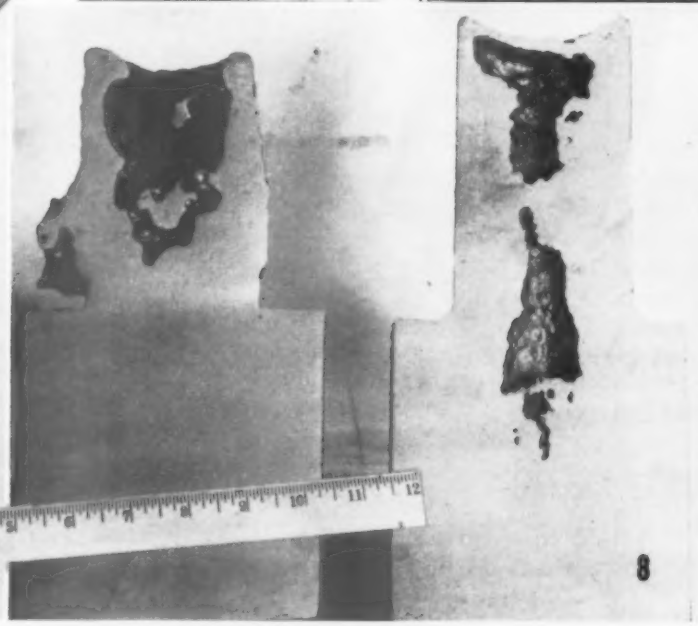
Figs. 7, 8 and 9—Steel test castings: Insulated riser used on casting at left, uninsulated riser on casting at right

Fig. 10—Steel test castings: Casting at left fed with insulated riser; casting at right fed by sand enclosed riser

Fig. 11—Casting bled one minute after pouring: Wall *A* cast against steel chill, wall *B* against oil-sand core, wall *C* against green sand facing, and wall *D* against sawdust insulating material







Bitten by the Foundry B

A talk delivered by the author before the Detroit Chapter of the American Foundrymen's Society at its father and son night

EVERY once in a while someone asks me "What ever possessed you to take up the foundry as a hobby?" Sometimes in fun I answer by saying that after slaving and sweating at my backbreaking work of travel, speech-making, writing and kitchen conventions I like to rest up by shoveling sand, ramming up molds and pouring heavy metal.

I must say, though, that when I do take the question seriously and try to explain how I became a foundry nut, and why I feel the way I do toward the work, I have one heck of a time. However, after talking to some of my old dyed-in-the-wool foundry friends, who, after spending a life time at the business, couldn't be dragged away from it with a team of horses, I don't feel so badly about not being able to come up with a snappy answer.

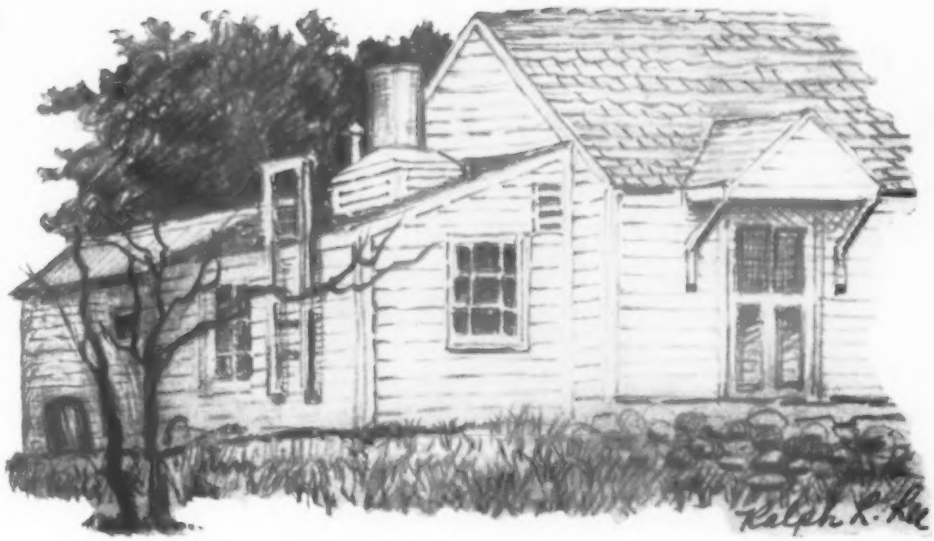
Now that I think of it I don't know any of these old timers who are able to put into words the reasons why they have stuck to the trade through thick and thin, and would feel like a fish out of water away from it. I guess it's hard for any one to explain but, hard or not, there is a reason which, once uncovered and put into understandable words, might go a long way toward preventing young men from missing the boat in a darned good business. It is a good boat, a solid old boat that sails right along on a steady course through storm or calm toward the shores of pride, profit and satisfaction.

Maybe my keen interest in the foundry goes back to my Grandpa, old Grandpa Lee, a real he-molder who kept right on working till he was over seventy. At the time I remember him best he worked in Springfield, O., where he made castings for gasoline farm engines. My Dad told me that Grandpa was one of the first to figure out how to set the tricky water jacket cores for the cylinders. I believe that Pop worked in the core room for a while.

But anyway the thing that stands out in my memory is Grandpa coming up the lane from work with a little wicker lunch basket hanging from his arm. I can just see him now stopping by the summer

By RALPH L. LEE

Bug



kitchen and Grandma handing him a towel through the screen door, with a loud and unmistakable hint that he'd have to get some of the grime off of him if he expected to get any supper. He always handed me his lunch basket in which I never failed to find a cookie or a banana he had left for me.

Then with much snorting, puffing, blowing and splashing he'd proceed to follow Grandma's instructions, although when he got through there were always black rings around his eyes. I always suspected too that in spite of the washing there still remained enough sand in his mustache to make one of the smaller cores.

Grandpa smelled like the foundry with just a touch of strong chewing tobacco and on Saturday nights when he brought his pay envelope home another smell was added, the unmistakeable aroma of a beer or two he had picked up on the way.

Maybe it was because I liked Grandpa so much that I liked the way he smelled. In any event even to this day I still like that smell and if I don't look out, my feet automatically head into the wind toward any place that smells the way Grandpa used to smell.

When I grew a little older Grandpa made me a small flask out of a cigar box. He brought some sand home and whittled me out a pattern. Then he showed me how to make a mold. It looked so easy that I could hardly wait 'til he let me try. But when I did try I almost cried. I found that it wasn't nearly as easy as it looked. But I kept on trying with little hard fought gains in skill and an ever increasing respect for Grandpa.

As time went on I visited the foundry where he worked and watched him and his buddies. The more I watched them the more convinced I became that there were no short cuts to learning the trade, few slick tricks and probably the biggest difference between knowing how a job is done and ability to do it yourself than in any other trade or profession I had come across.

I hope that I am not permitting sentimentalism to get the better of my judgment but I am convinced that any young man investing time in developing the art of molding into a definite skill is making one of the safest investments possible for him to make. I mean to say that, since, as far as I have been able to see, there are no slick tricks, trade secrets or sleight of hand in the molding business—any man, either young or old, can rest assured that no one is going to run circles around him unless they have invested the time it takes to match the skill he has acquired. In my opinion the foundry business is one of the safest places to invest your time, work, thought or money. Maybe this is one of the reasons why I am so deeply interested in the work.

Sometime ago the research department of a well known manufacturing concern asked to use my little pewee cupola and foundry for some melting tests. I felt quite proud of this and particularly so when they insisted that I boss the job over several week ends. The head man came on out with a little crew and was very much impressed with what he saw in both my foundry and the pattern shop. He asked me whether I would mind if he sent out his staff engineers to see the place. I told him that I certainly wouldn't mind, in fact I would be glad to have them.

"By the way," I said, "do you want them to come out to see how far a person can go toward being a foundry nut?"

"No Doc," he said, "that isn't it. I want them to see what can be accomplished with a little ingenuity, enthusiasm, hard work and practically no budget. It seems to me that every time any of the boys come to me with a project they can't turn around for less than five thousand. When the boys come out, tell them why you started your little foundry."

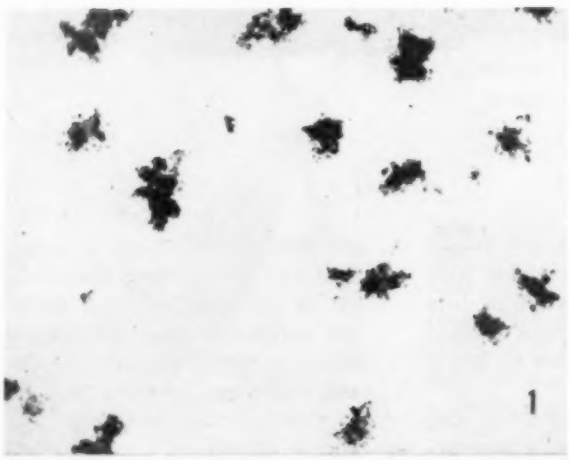
Three separate batches of engineers finally made the grade so of a necessity I had to work out a presentation on how and why the hobby foundry started. Since the story covers the next step in my foundry history I thought it would fit in here with you folks.

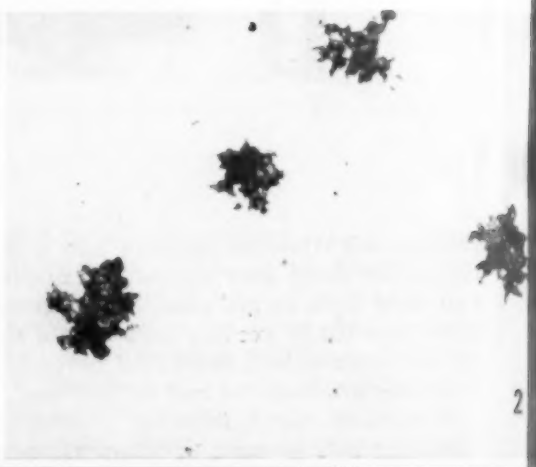
When, as a kid on the (*Please turn to page* 160)

DEOXIDATION OF WHITE CAST I

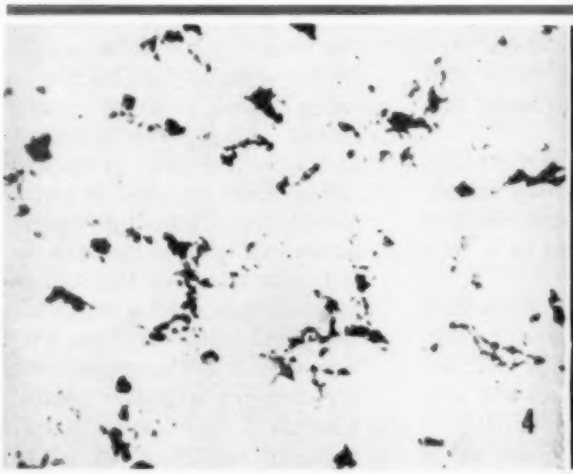
....An Interpretation Applied t Ma

By RICHARD W. HEINE
Assistant Professor of Metallurgy
University of Wisconsin
Madison, Wis.





Figs. 1 through 4—Graphite distribution after complete first stage graphitization at 1700° F (X150). Fig. 1—Base melting stock. Fig. 2 — Heat A-1 (see Table I), 0.045 per cent Al addition. Fig. 3 — Heat A-2, 0.090 per cent Al addition. Fig. 4 — Heat A-3, 0.12 per cent Al addition



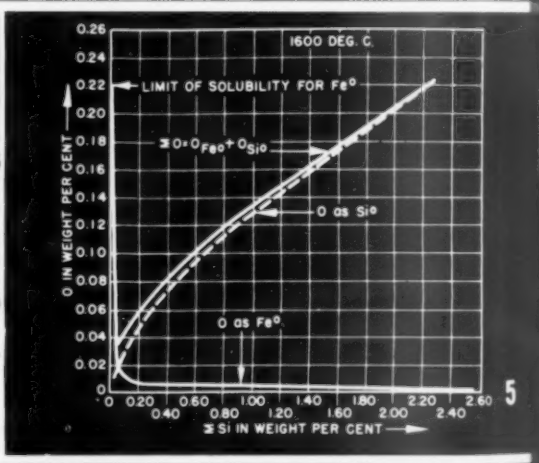
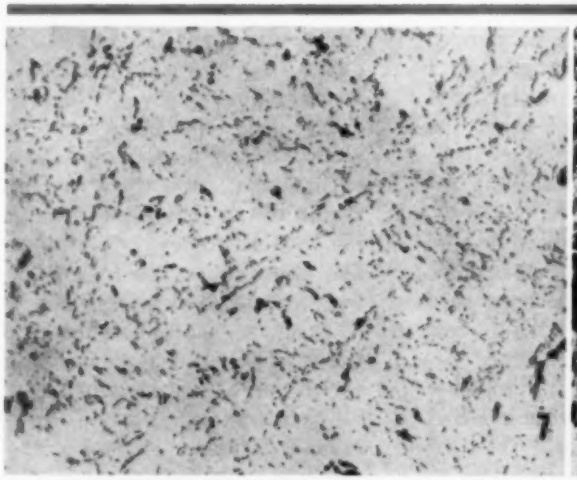


Fig. 5—Effect of SiO on total oxygen content of steel at 1600°C

Figs. 6, 7—Graphite distribution at end of complete first stage graphitization at 1700°F (X150). Fig. 6 — Heat A-5, 0.18 per cent Al addition. Fig. 7 — Heat A-8, 0.70 per cent Al addition



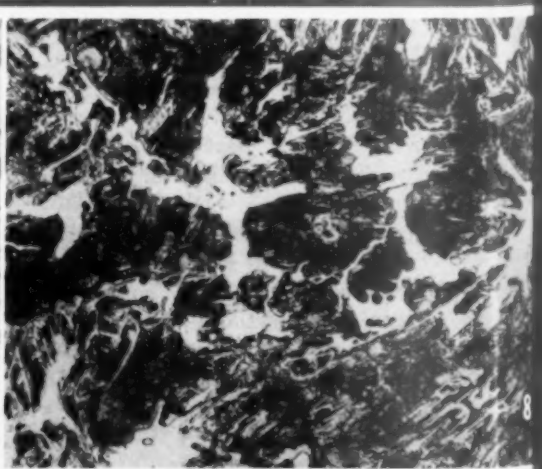
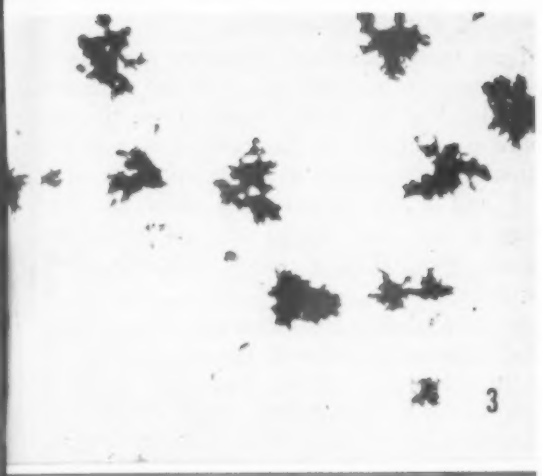


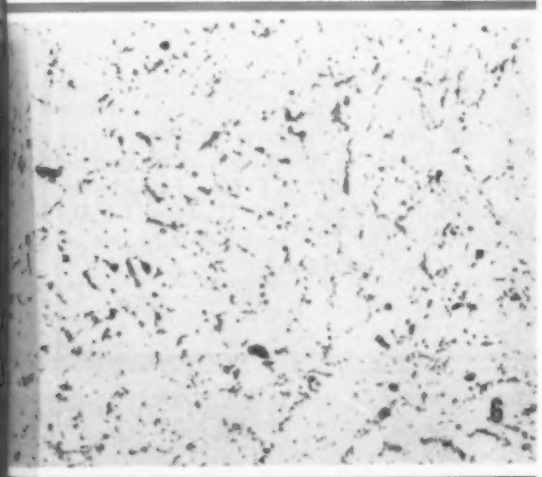
Fig. 8 — Initial structure of base melting stock showing massive carbides and pearlite areas (X250)

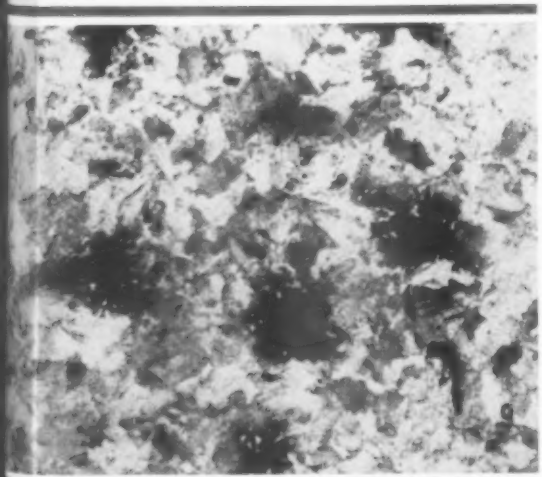
Fig. 9—Base melting stock, nodular graphite and pearlite obtained after 32 hr at 1700° F, followed by air cooling (X250)

IRON

Malleable Irons







MALLEABILIZING heat treatment occupies a position of prime importance in the production of malleable castings. The heat treating operation permits the development of the combination of strength and toughness which makes malleable iron unique among cast irons. While the principle and practice of the heat treatment are well known, the results of malleabilization have not always been dependable and have required undesirable long heat treating cycles.

A great deal of research has been expended to determine the variables of the process and to improve its product. Nevertheless, many of the factors involved have not been clarified. For instance, effects due to the presence of dissolved gases in the metal are but little understood. Oxygen, hydrogen, and nitrogen are always present in the iron and their influence on the results of the malleabilizing process have long been of interest to malleable iron foundrymen and metallurgists. This paper deals with some phases of the effects of oxygen as revealed by deoxidizing treatments applied to white cast irons.

Oxygen—Cast irons have ample opportunity to take on oxygen. Rust and moisture on the furnace charge, humidity in the air for fuel combustion, oxidation during the melting procedure, and all operations of handling the molten metal may contribute oxygen to the metal. In spite of this fact, it is generally argued that the oxygen content of cast irons is low because of the high silicon percentage normally present. Oxygen is said to leave the metal until only a few thousandths of a per cent remains. The efflux of oxygen is supposed to occur through the formation of silica and silicates which join the slag or remain distributed as non-metallic inclusions when the metal solidifies. Recently, however, considerable experimental evidence has accumulated that points to the presence of a relatively high oxygen percentage in cast irons, even with normal amounts of silicon in the analysis.

Quantity of Oxygen May Increase

Sims and Zapffe[1] have shown that under certain conditions it is actually possible to have the oxygen percentage increase with an increased silicon content in the iron. Fig. 5[2] is reproduced from their work and it shows some oxygen content ranges possible in iron-silicon alloys. Sims and Zapffe's experiments revealed that oxygen in the range of 0.10 to 0.20 per cent may exist in iron alloyed with 0.80 to 2.00 per cent silicon when the oxygen occurs mainly as silicon monoxide. An additional factor influencing the total oxygen content of cast iron may be the presence of dissolved carbon monoxide, according to Chipman and Schneble[3]. Actual chemical analyses for oxygen in foundry pig irons have been recently reported by Hurst and Riley[4], and these show percentages higher than that considered likely on the basis of their carbon and silicon contents. This is also true of some of the ferrosilicon materials[1].

Apparently there is sufficient evidence to question the assumption that the oxygen content of cast irons is necessarily low. No such assumption is made in the case of steel melting for castings. In fact, the hyperbolic curve of Fig. 5 suggests that a white cast iron containing .80 to 1.6 per cent silicon may be relatively little better deoxidized than a cast steel containing 0.20 to 0.7 per cent silicon. Yet, deoxidation is considered a nonessential practice in white iron melting while steel for castings is commonly deoxidized. Considering that oxygen may be present in white iron, deoxidation practices similar to those employed in the steel foundry are suggested. Furthermore, deoxidizing treatments may be employed to study some of the effects of oxygen on the characteristics of white and malleable irons.

Powerful deoxidizers may be added to the molten metal to fix the oxygen as stable oxides. By rendering the oxygen in the melt inert in this way, it is possible to observe indirectly the effects of the oxygen on the graphitizing process. Metal of a particular oxygen content can be deoxidized stepwise to the point of complete deoxidation by adding progressively larger amounts of a deoxidizer. Samples can thus be obtained which vary from no deoxidation to complete deoxidation and which make it possible to observe the effects of a stepwise conversion of the oxygen in the melt to stable and relatively inert oxides. A detailed account of the procedure and results obtained with this method of studying the effects of oxygen on a malleable iron has been given in a paper[5] presented at the AFS convention in St. Louis. Only certain conclusions of the investigation, those which may be of practical significance, will be discussed at this time.

Melting Procedure—A number of heats of white iron that received deoxidizing treatments were prepared. All irons were melted in an induction furnace. The charge to the furnace consisted of commercially cast white iron shrink-bobs and tensile bars obtained from a single heat of air furnace malleable iron. Deoxidizing additions were made to the melt using aluminum, 40 per cent ferrotitanium, a special 40 per cent zirconium alloy, or hydrogen. The magnitude of the deoxidizing additions is listed in Table I. The chemical analysis of the base melting stock and several of the deoxidizer-treated heats are also shown in Table I. These irons were cast into test pieces suitable for heat treatment and metallographic study.

Test pieces from each heat were given an annealing heat treatment aimed at studying the effects of deoxidation treatments on the first stage graphitizing process. The heat treating cycle consisted of heating 1450° F in one hour, from 1450° F to 1750° F in one hour, and holding at 1700° F for selected periods from 5 minutes to 60 hours. The holding period at 1700° F was followed by air cooling to room temperature. The samples were then sectioned and examined microscopically.

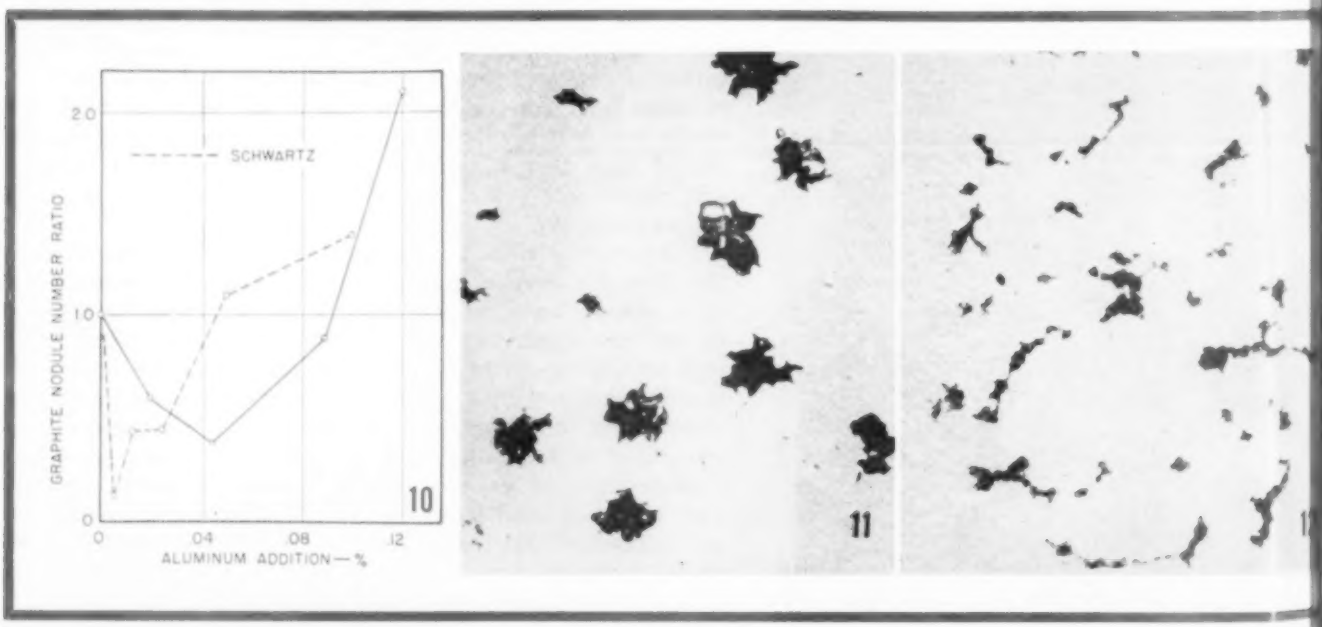
A relationship was soon found to exist in the heat treated irons between the extent of deoxidation and some basic fundamentals of the graphitizing process. The number of graphite nodules and the time required for complete first stage graphitization was markedly affected. It was noted that small additions of the aluminum deoxidizer caused a marked decrease in the number of nodules, while larger additions resulted in an increasing number of nodules. These effects are shown in Figs. 1, 2, 3, 4, 6, 7 where the graphite distribution at the end of first stage graphitization is revealed. The unetched portion of the structure in these figures consists of pearlite developed during air cooling.

Similar effects with aluminum additions have been reported by Schwartz[6], and his data and the author's were used to plot Fig. 10, which summarizes the effect of aluminum additions on the number of nodules developed during first stage graphitization in this iron. Figs. 8 and 9 are included to show the as-cast structure of the base metal and its structure on air cooling from 1700° F after complete first stage graphitization.

The fine graphite distribution shown in Figs. 6 and 7 occurs when the magnitude of the aluminum deoxidizing addition is large. Finely dispersed graphite has also been obtained during first stage graphitization by deoxidation of the melt with titanium, boron, and hydrogen[5, 7].

Fig. 10—Ratio of number of graphite particles in untreated iron to number of graphite particles in aluminum treated iron plotted against aluminum addition

Figs. 11 through 13—Graphite distribution after complete first stage graphitization at 1700° F (X150). Fig. 11—Heat T-2, 0.090 per cent Fe-Ti addition. Fig. 12—Heat T-5, 0.18 per cent Fe-Ti addition. Fig. 13—Heat T-6, 0.24 per cent Fe-Ti addition



That the aforementioned effects are linked with the deoxidation process rather than an alloying effect of the elements has been pointed out at some length in a paper by the author dealing with the deoxidation subject[5]. However, an interesting example may briefly be considered in the case of deoxidation with titanium using the commercial 40 per cent ferrotitanium grade. With increasing ferrotitanium additions it was possible to show the effect of an increasing number of graphite particles after first stage graphitization as in the case of aluminum deoxidized irons. However, when the addition provided an amount of titanium exceeding that necessary for deoxidation, the alloying effect of the residual titanium in the metal caused a return to nodular type graphite rather than the fine graphite dispersion. This effect is revealed in Figs. 11 through 13.

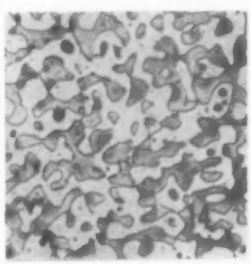
Apparently, with a sufficiently large addition, the titanium not participating in the deoxidizing process exerts a carbide stabilizing effect that results in the formation of fewer graphite particles as revealed by a comparison of Figs. 12 and 13. In connection with the ferrotitanium, it should be remembered that the addition of many commercial ferroalloys to a molten iron often means that aluminum as well as the desired element is being introduced. Some grades of commercial ferrotitanium, for example, may contain as much as 8 per cent aluminum.

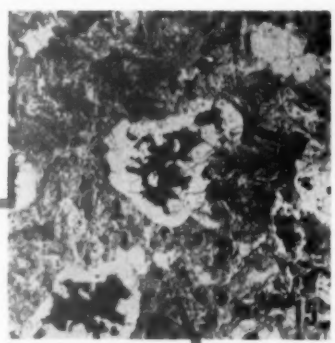
The influence of deoxidizing treatments on the graphite nucleating characteristics of a white iron are further clarified by the striking similarities which may be observed between the effects of aluminum, titanium, hydrogen and boron additions to white irons. The use of boron as an inoculator and a means of shortening first stage graphitization is well known and commonly practiced. Miksch, Fabert, and Cover[7] have recently shown the pronounced effect of boron additions on the number of graphite particles developed during a malleabilizing heat treatment. Figs. 15, 16 and 17 are reproduced from their work and reveal the nucleating tendencies of a boron-treated white cast iron having a base analysis of 2.41 per cent C, 1.19 per cent Si, 0.33 per cent Mn, 0.080 per cent S, 0.127 per cent P.

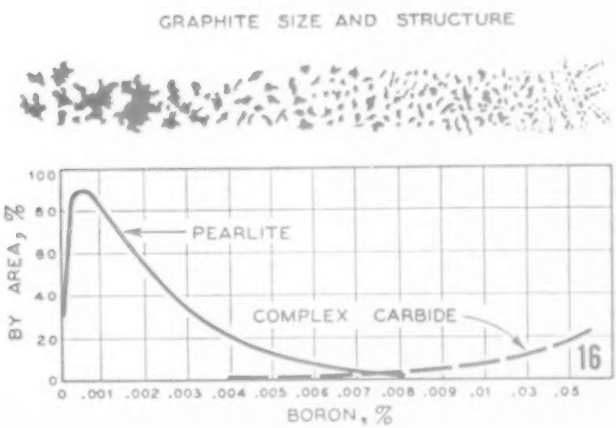
This iron was treated with boron additions ranging from 0.0005 to 1.0 per cent by the aforementioned workers and then given a malleabilizing heat treatment with effects on the number of graphite nuclei as summarized in Fig. 16. While boron is a so-called nucleating agent, additions of less than 0.0012 per cent actually decreased the number of graphite particles in the work done by the aforementioned investigators. This effect of a diminished number of nodules is identical with that reported for aluminum additions in small amounts. The same effect has also been observed for titanium. With boron additions greater than 0.0012 per cent, the pronounced nucleating effect attributed to boron is readily observed by a comparison of Figs. 15 and 17.

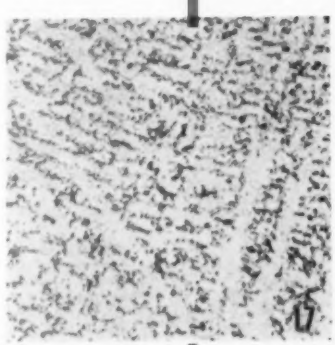
Evidently the results obtained by Miksch, Fabert and Cover with boron additions closely parallel those obtained in the author's work with aluminum. The 0.047 per cent boron addition which produced the

Fig. 14[7]—Iron with about 1 per cent boron addition after annealing 88 hours at 1700° F (X500, Stead's reagent)
Fig. 15[7]—Iron with 0.0012 per cent boron addition. Annealed 2 hours at 1700° F (X100, nital etch)
Fig. 16[7]—Graphical presentation of effect of boron additions on number of graphite nuclei
Fig. 17[7]—Iron with 0.047 per cent boron addition. Annealed 2 hours at 1700° F (X100, nital etch)









effect shown in Fig. 17 may be equivalent to approximately twice that percentage of aluminum in deoxidizing effect. Boron has been shown by Gurry[8] to follow closely after aluminum and zirconium in its deoxidizing power. However, since its atomic weight is less than one-half that of aluminum a smaller weight percentage is required for an equivalent amount of deoxidation. The fine graphite dispersion shown in Fig. 17 is similar to that of Fig. 6, which was obtained with aluminum deoxidation. However, boron in excess of the amount required for deoxidation and sufficient for alloying behavior, prevented the graphite nucleation by rendering the complex carbide or other compounds stable. This condition is shown in Fig. 14 reproduced from reference [7].

When hydrogen functions as a deoxidizer, it is also capable of producing the very fine graphite dispersions referred to above. This has been demonstrated in reference [5].

Effects on Primary Graphitization Time—The time required for complete first stage graphitization is altered considerably by the deoxidation treatments. When no deoxidizing material was added, the white irons used in this investigation required about 32 hours at 1700° F to obtain complete first stage graphitization. The effects of aluminum and ferrotitanium treatments of the melt on the holding period required at 1700° F to obtain complete first stage graphitization is shown in Figs. 18 and 19. These curves show that the first stage annealing time is reduced considerably by deoxidizing additions.

With aluminum additions, the time required for first stage graphitization decreases as the magnitude of the addition increases, as shown in Fig. 18. Likewise, the first effect obtained with titanium is a decrease in the time of first stage graphitization. But when titanium is added to the melt beyond the amount required for deoxidation, the alloying effect of titanium as a carbide stabilizer is obtained, and the first stage annealing time increases rapidly as shown in Fig. 19. Thus, the dual behavior of titanium as a deoxidizer and carbide stabilizer is revealed.

With a 0.60 per cent Fe-Ti addition, or 0.24 per cent Ti, the iron showed only partial primary graphitization even after 60 hours at 1700° F. Such resistance to first stage graphitization is directly comparable to that reported by Miksch, Fabert and Cover in their study of boron-treated white irons when a 1 per cent boron addition was made. Apparently boron and titanium are quite analogous in their effects although boron is much more potent. Both speed first stage graphitization when added as deoxidizers in proper amounts. In amounts greater than that required for deoxidation, their alloying behavior of retarding (*Please turn to page* 229)

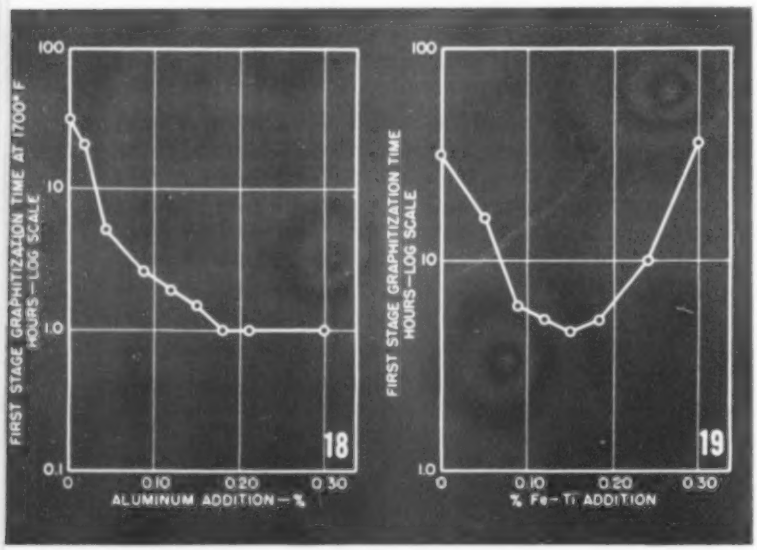


Fig. 18—Time required for complete first stage graphitization plotted against percentage aluminum addition

Fig. 19—Time required for complete first stage graphitization plotted against percentage ferrotitanium addition

TABLE I—Iron Compositions and Analyses*

Heat No.	Description	Per Cent Total C	Per Cent Si	Per Cent Mn	Per Cent P	Per Cent S	Per Cent Cu	Addition Per Cent Al	Residual Per Cent Al
B. M. S.	Base melting stock	2.24	0.91	0.63	0.152	0.113	0.66	0.0	....
A-1	Aluminum-treated	2.10	0.92	0.63	0.172	....	0.61	0.045	trace
A-2	Aluminum-treated	2.10	0.92	0.63	0.160	....	0.62	0.090	trace
A-3	Aluminum-treated	...	...	...	....	....	...	0.12	None
A-4	Aluminum-treated	...	...	...	....	....	...	0.15	None
A-5	Aluminum-treated	...	...	...	....	....	...	0.18	0.116
A-6	Aluminum-treated	...	...	...	....	....	...	0.21	0.082
A-7	Aluminum-treated	...	...	...	....	....	...	0.30	0.196
A-8	Aluminum-treated	2.12	0.94	0.63	0.170	....	0.60	0.70	0.56
A-9	Aluminum-treated	...	...	...	....	....	...	0.020	....
H-1	Base stock remelted under H_2 at 2500° F.	...	...	...	....	....	...	0.00	....
H-2	Heat A-5 remelted under H_2 at 2750° F.	2.19	0.94	0.65	0.172	....	0.61	Heat A-5	0.12

							Addition		
	FERROTITANIUM-TREATED HEATS						Per Cent Fe-Ti	Per Cent Ti**	Per Cent Al**
T-1	Ferrotitanium Treated	...	...	...	....	....	0.05	0.020	0.004
T-2	Ferrotitanium Treated	...	...	...	....	....	0.09	0.036	0.007
T-3	Ferrotitanium Treated	...	...	...	....	....	0.12	0.048	0.0096
T-4	Ferrotitanium Treated	...	...	...	....	....	0.18	0.072	0.0146
T-5	Ferrotitanium Treated	...	...	...	....	....	0.24	0.096	0.0192
T-6	Ferrotitanium Treated	...	...	...	....	....	0.30	0.12	0.024
T-7	Ferrotitanium Treated	...	...	...	....	....	0.45	0.18	0.036
T-8	Ferrotitanium Treated	...	...	...	....	....	0.60	0.24	0.048

* Metal supplied by the Chain Belt Co., Milwaukee, and chemical analyses by courtesy of W. B. Sobers, metallurgical chemist, the same company.
** Calculated from average ferrotitanium analyses.

A METALLURGIST LOOKS AT Steel Foundry Operations

By EVERETT R. TURNER
Melting Superintendent
Siderurgica Venezolana "Sivensa" S. A.
Caracas, Venezuela

THE STEEL foundry occupies an unusual place in the scheme of things. The general public has very little understanding of the steel industry in general and the steel foundry in particular. The steel foundry is an essential industry and it has not received the recognition it deserves. This is due in a large measure to the industry itself. Busy with the problems of steel founding and supplying a multitude of other industries with essential parts it has neglected to keep the public informed of its special problems.

Being a supplier for other industry, the steel foundry is not able to operate without definite orders. It cannot operate during slack periods and stockpile its output, but must operate with greatest output when labor and material are both expensive and difficult to obtain. Consequently the steel foundry is particularly bedevilled with high operating costs and a multiplicity of problems arising from its peculiar position. It is the purpose of this article to offer some suggestions and ideas which may enable the small electric foundry to gage its performance, especially the operation of its steel making units.

Recently at a meeting of the Calumet Chapter of the American Society for Metals, the eminent metallurgist, Harry W. McQuaid, expressed the opinion that metallurgists are usually so absorbed with quality considerations that they tend to exceed service requirements by a large margin and thus unnecessarily increase costs. This is a statement of fact and in view of the present trend of metal economics deserves a great deal of consideration. The active foundry metallurgist will do well to examine the position of his company in regard to quality and cost considerations.

It is difficult to obtain figures upon which to base a comparison of operating costs. Foundry location, type of castings produced as well as many other factors tend to produce different operating costs and figures obtained for comparison may be very misleading and lead to radically erroneous conclusions.

A complete breakdown of operating costs is the best method to follow operating costs and to note variations therein. Such a breakdown of operating costs will show up many interesting things which may otherwise go unnoticed. Changes in practice may lead to unwelcome increases in costs and unless such increases are noted promptly, and acted upon, will lead to unwarranted expenditures.

The small foundry may not have the complete cost accounting system desirable for this work but it should not be difficult for the foundry to assign some member of its staff to this work for a few days each month. It is time and effort well spent, and if acted upon, will result in more efficient operation.

The cost accounting should, however, exist only to show the facts in as simple a manner as possible. It does not have to be elaborate—indeed it is better not so. Cost accounting is not an end in itself, it is the means to an end, in this case the end is the maintenance of the lowest possible operating costs. Thus the cost accounting exists to show the operating department how and where it is spending the money. It is the operating men who have to make the decisions responsible for the expenditures.

The figures which are of the greatest interest to the operating executive are the cost per ton of steel produced and the cost per ton of finished castings. Since the average steel foundry yield does not greatly exceed 50 per cent, it may be reasoned that any saving made in the first figure will be nearly doubled in the saving per ton of finished castings.

A suggested break-down of operating costs for the electric furnace is as follows:—

1. Labor, (a) Direct, (b) Indirect, (c) Repairs.
2. Refractories, (a) Linings, (b) Roofs, (c) Fettling & Patching.
3. Power, (a) Direct, (b) Indirect.
4. Scrap.
5. Ferroalloys.

(*Please turn to Page* 222)

Malleable Founders'

HOLDS ANNUAL MEETING

REVIEW of a year of considerable progress and a discussion of problems still facing the industry were presented to members of the Malleable Founders' Society at their annual meeting held at the Homestead, Hot Springs, Va., June 16-17. Approximately 140 members and guests attended the meeting.

New officers elected for the ensuing year are: President, James H. Smith, general manager, Central Foundry Division, General Motors Corp., Saginaw, Mich.; vice president, Ralph T. Rycroft Sr., Kencroft Malleable Co. Inc., Buffalo; treasurer, Dudley V. Walker, managing director, Eberhard Mfg. Co., Division of Eastern Malleable Iron Co., Cleveland. Lowell D. Ryan was re-elected managing director. The following new directors were elected: Mr. Rycroft; W. Scott Roby, Peoria Malleable Castings Co., Peoria, Ill.; H. P. Blumenauer Sr., Albany Castings Co. Inc., Voorheesville, N. Y.; Arthur F. Jackson, Lake City Malleable Co., Cleveland.

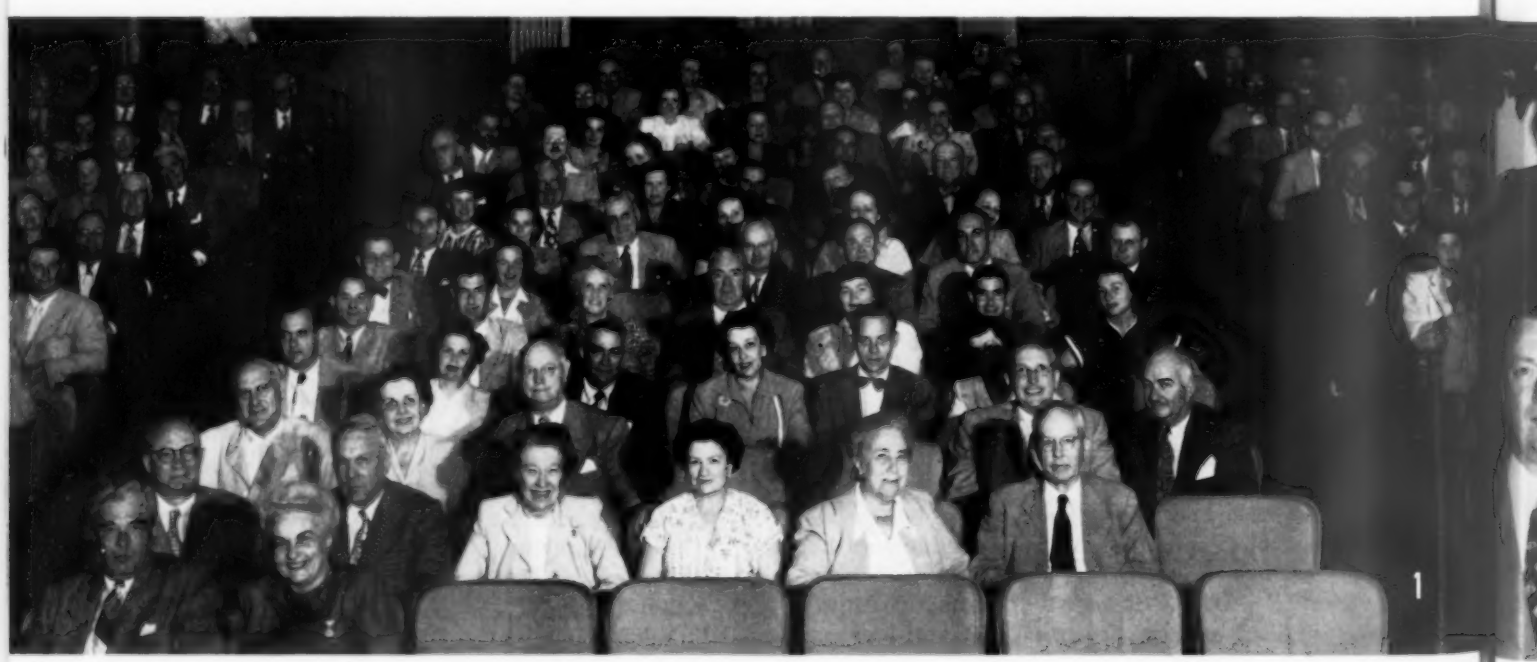
Featuring the annual banquet was the presentation of the Charles H. McCrea award medal for 1949 to Anthony Haswell, president, Dayton Malleable Iron Co., Dayton, O. The presentation, made by Cal C. Chambers, Texas Foundries Inc., Lufkin, Tex., honored Mr. Haswell for his leadership in educational activities which were an important factor in formation of the Foundry Educational Foundation, which he served as one of its first officers.

Mr. Haswell, a Princeton University graduate, has been president of the Dayton Malleable company since 1942 when he succeeded his father. He is a past president of the Malleable Founders' Society and was recently honored with life membership in the American Foundrymen's Society.

The banquet also was the occasion for presentation of a resolution of sympathy on the recent death of Robert R. Fauntleroy, president, Moline Malleable Iron Co., St. Charles, Ill., and the Charles H. McCrea medalist of 1948.

In presenting the president's annual report at the opening session, Collins L. Carter, president, Albion Malleable Iron Co., Albion, Mich., pointed to the year's outstanding accomplishments by the society through its standing committees and staff, and detailed some of the requirements that must be met if the industry is to hold and improve its place in a fast changing economy. These latter he listed under the general headings of: Effective organization, planning and cost control, mechanization, quality control and marketing techniques.

Mr. Carter urged the members to strengthen their sales and product engineering efforts and seek to obtain new business on the basis of quality, performance and cost. Pressure to meet (*Please turn to page* 133)



Society

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

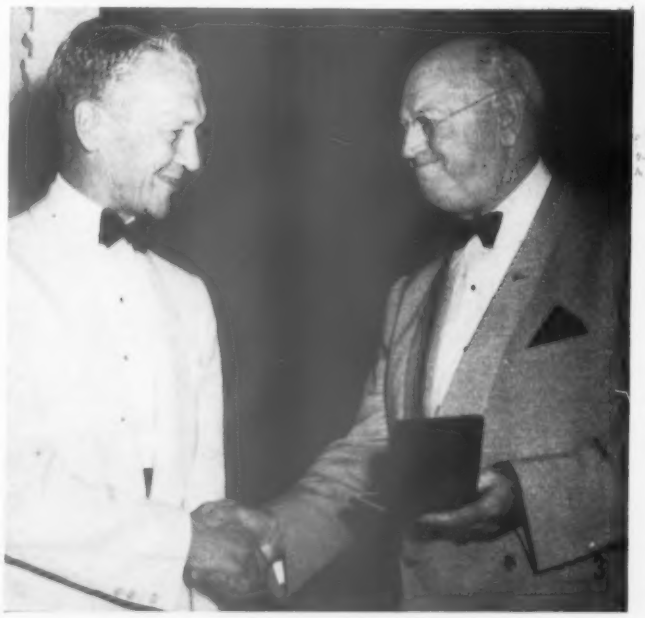
JAMES H. SMITH
President

RALPH T. RYCROFT
Vice President

Fig. 1—Group picture taken at the meeting

Fig. 2—Malleable Founders' Society directors for the coming year. Front row, left to right, are: Collins L. Carter, Albion Malleable Iron Co., Albion, Mich.; Ralph T. Rycroft, Kencroft Malleable Co., Buffalo; James H. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich., and John T. Llewellyn II, Chicago Malleable Castings Co., Chicago. Center row, left to right: W. Scott Roby, Peoria Malleable Casting Co., Peoria, Ill.; John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; Henry P. Blumenauer Sr., Albany Casting Co., Voorheesville, N. Y., and Frank D. Brisse, Laconia Malleable Iron Co., Laconia, N. H. Back row, left to right: Arthur F. Jackson, Lake City Malleable Co., Cleveland; James H. Lansing, technical and research director, Malleable Founders' Society, Cleveland; Lowell D. Ryan, managing director, Malleable Founders' Society; Frank O. Parker, Dayton Malleable Iron Co., Dayton, O., and Charles A. Gutenkunst Jr., Milwaukee Malleable & Grey Iron Works, Milwaukee

Fig. 3—At left, Anthony M. Haswell, president, Dayton Malleable Iron Co., Dayton, O., receives the Charles H. McCrea award from Col. C. C. Chambers, president, Texas Foundries Inc., Lufkin, Tex.



Machine M

OF STEEL C

By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

This is the second of four articles describing machine molding practice in the steel foundry. The first article was presented in the July issue

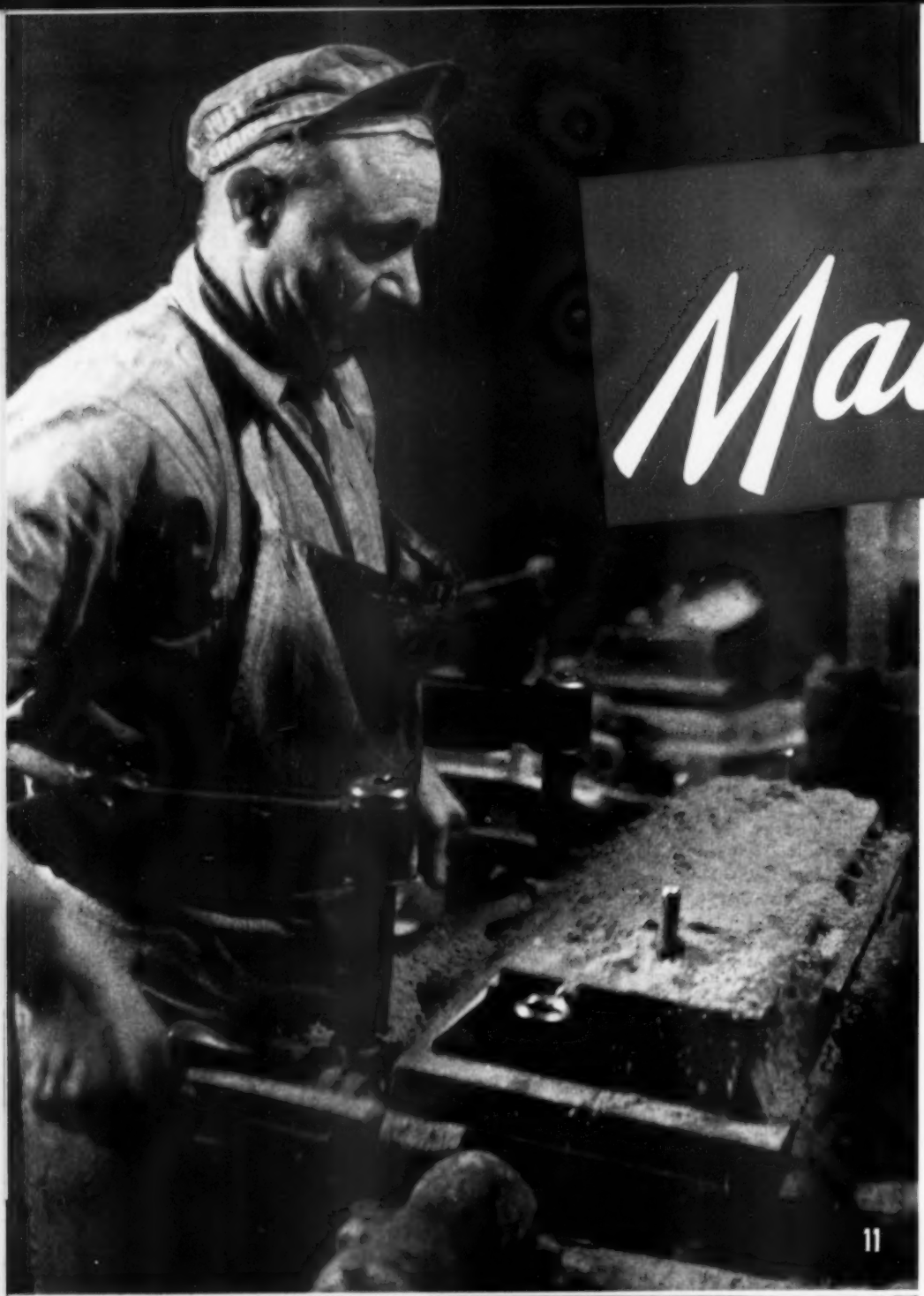


Fig. 11—Simple hand-jolt machine

Fig. 12—Cope pattern mounted on well-board

Fig. 13—Small power-operated jolt machine

e Molding

E CASTINGS

WHEN strip or snap flask molds are moved on conveyors, they must not be pushed along carelessly, so as to slide the copes on the drags. Even in carrying snap or strip flask molds to the conveyor, men may cause shifts by holding the molds too close to their bodies, and pushing the copes out of position.

Squeezer machines also are used to make shallow cores with one or more flat sides. When stacks of cores are to be used, they may be made on squeezers, and in this case the practice is often followed of forming the shape of one half of the mold on the bottom of the core, and that of the other half on the top. This is done by mounting the pattern that forms the impression in the top of the core on the squeezer head, and thus producing two impressions at one stroke of the machine.

If the pattern to be used is fairly deep, and especially if it has narrow, deep pockets in it, a squeezer machine will not produce a properly rammed mold. The sand in the pockets will not be compacted adequately, and the same will be true also of much of the sand, except what is in contact with horizontal surfaces close to the squeezer plate. Work that can be molded in quantity in shallow flasks, such as can be made advantageously on plain squeezer machines, is much more often ordered from gray iron and malleable iron foundries then from makers of steel castings. Therefore, as already indicated, plain squeezers are used only to a limited extent in steel foundries, which more often install jolt-squeezers.

Jolters, like squeezers, are as a rule power operated, but some of the smallest ones are worked entirely by hand. One machine of the simplest type shown in Fig. 11, consists of a rigid stand, supporting a pair of arms mounted on hinges so that they can be revolved in a vertical plane. By means of handles, a table fastened to the ends of the arms is raised a few inches by hand, and banged down against rigid stops. An open-side core box, or a pattern board, pattern and light flask, are clamped to the table by means of quick-releasing devices, filled with sand and jolted until the sand is properly compacted. The excess sand is then struck off, the mold gone over with a small hand rammer, and a bottom board or core drying plate is clamped in position.

The arms and table are turned over on their hinges until the flask or box rests on supports on the side of the machine opposite to that on which the ramming was done. Finally, the clamp is released, the box is lifted off the core, or the pattern drawn from the mold, and the table returned to ramming position. As a rule, the drawing of the pattern is carried out by a lever-operated device that lowers the core out of the box, or the mold away from the pattern, and a vibrator is used to loosen the sand around the pattern or the inside of the box. These machines, usually made with tables not over 1½ x 2 ft, though they can be used to ram up molds, are far more often utilized to make cores.

Somewhat larger types, while retaining the hand roll-over feature, are made with air cylinders substituted for hand jolting as shown in Fig. 13. This of course tends to give a more uniformly rammed job, since in using the hand jolted machines the degree of ramming may vary with different operators, while with a mechanically operated device, the number of jolts can be fixed, and the intensity of the jar is always the same. The air-operated jolters with mechanical roll-over and pattern draw features are used for still larger work, and are made in a wide range of sizes and lifting capacities.

Plain jolters operated by compressed air cylinders have been made in all sizes, from machines with tables perhaps 8 in. wide and 10 in. long, to giants capable of ramming 50 and 60-ton flasks 15 or 20 ft long and 5 or 6 ft deep. In principle, these machines are exceedingly simple, consisting chiefly of an air cylinder and a piston carrying the table on which

the pattern and flask, or the core box, are mounted. A valve alternately admits compressed air under the piston, raising the table a few inches, and allows the air to escape suddenly, dropping table, pattern and flask against stops set in the base of the machine. Details of the designs of the several makers differ somewhat, but all operate in very much the same manner.

The smaller machines may be either movable, or mounted on suitable foundations, while those of large capacity are always of the latter type. One of the features of a good jolter of medium or large size, is that the table should not be much larger than the base of the machine, and should not greatly overhang the stops against which it strikes in jolting. Naturally, the weight of pattern, flask and sand will seldom be distributed evenly over the surface of the table and if the latter overhangs its stops, jolting will impose unequal stresses. This wears the piston unevenly, and generally wracks the machine until it no longer hits true on its stops. The flask then tends to move about on the pattern board or the table of the machine. In some makes, there are a number of stops near the outer edge of the table itself, and the base of the machine is nearly as large as the table.

Small and medium sized plain jolters, consisting only of an air cylinder, piston and table mounted on an appropriate base, are extensively used for ramming up cores, especially those with one flat side or cores made in half boxes and jointed after ramming. They ram the sand tightest at the bottom of the box, which usually forms the part of the core that is to come in contact with the metal, and which should be well rammed. By jolting in two or more stages, it is not difficult to place the stiffening rods where they should be located. However, cores made up with arbors, cannot be satisfactorily jolted, as it is difficult to compact the sand evenly around a complicated arbor. As jolting proceeds, the sand under the arbor bars draws away from them, instead of being properly compacted, and there is absolutely no way of forcing more sand into the spaces thus left.

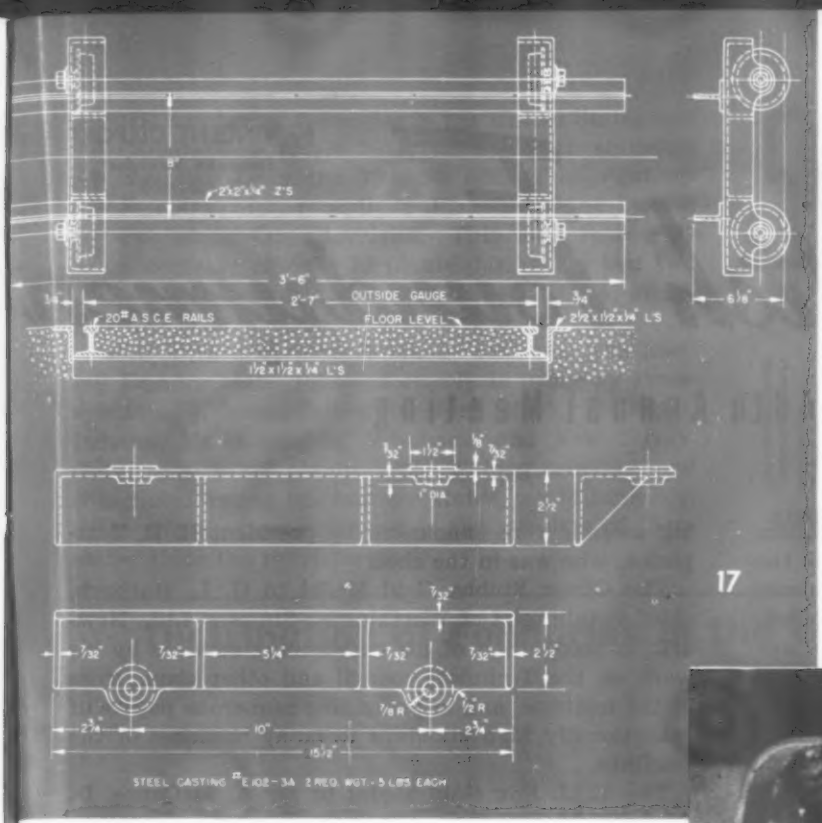
Under suitable circumstances, jolters may also be used to make whole cores in two-piece boxes that are rammed from one end and taken apart, leaving the core standing upright on a plate. However, long cores cannot be rammed evenly in this manner, and in any event if the sand in the upper part of even a fairly short box is to be properly compacted, it must be well butted off with an air rammer.

Plain jolters are not used for making complete molds from loose patterns, because to ram both cope and drag on such a machine with a split pattern, a shell pattern or a solid pattern and follow board, the cope must be jolted on top of the drag with the pattern in place. Under these conditions, if the bottom board fits over the drag flask, the sand in the latter tends to pull away from the pattern and thus gives an unsatisfactory mold. The bottom board, it is true, may be made to fit inside the drag flask, but even under these (*Please turn to Page* 175)

Fig. 14—Well-board on which pattern is mounted

Fig. 15— Drag pattern mounted on well-board

Fig. 16—Drawing large pattern from the mold with a crane



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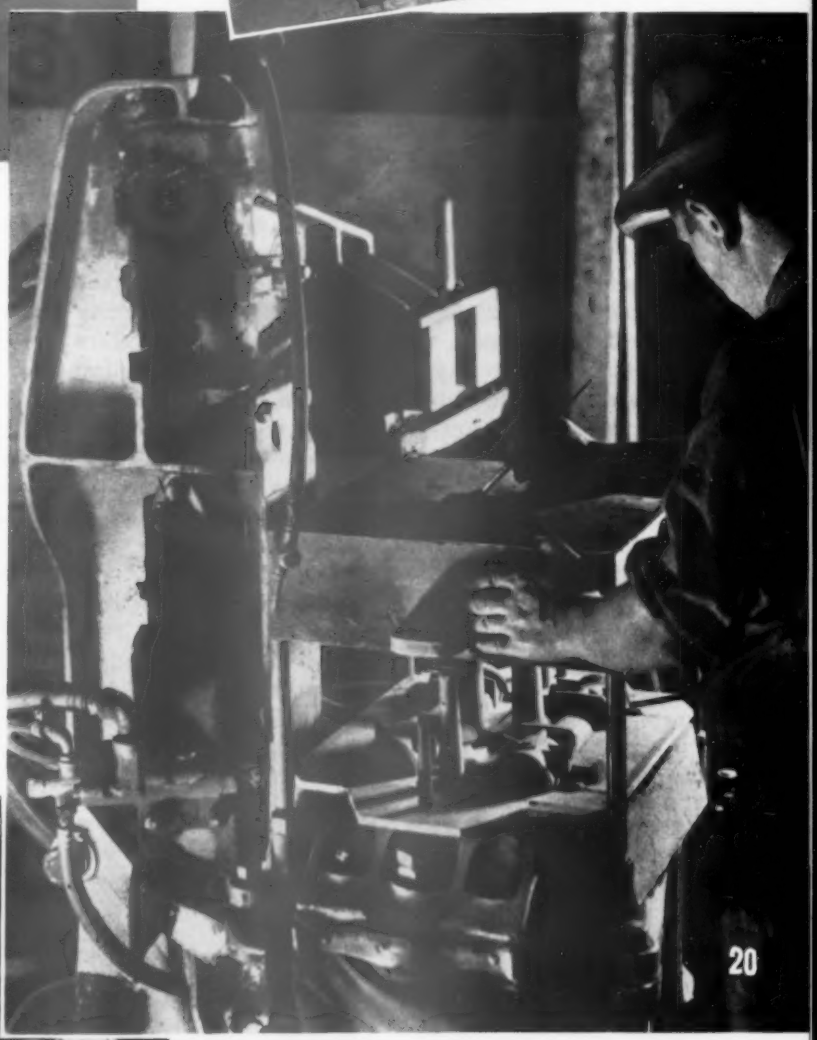

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Fig. 17—Details of skeleton car developed for snap-flask molds

Fig. 18—Rollover machine after drawing the pattern

Fig. 19—Molding machine employing lifting frame to raise the mold

Fig. 20—Pins on four corners of machine lift flask above the pattern

INSTITUTE OF British Foundrymen

Holds 46th Annual Meeting

By VINCENT DELPORT
European Manager
THE FOUNDRY

N P. NEWMAN, managing director of Newman, Hender & Co. Ltd., Woodchester, Glos., was the incoming president at the 46th annual conference of the Institute of British Foundrymen, held at Cheltenham, June 14 to 17. Mr. Newman recently was also elected chairman of the Council of Ironfoundry Associations, thus holding at the same time the two highest posts in the foundry industry of Great Britain. The conference was attended by well over 400 members and visitors, and its site, in one of the most pleasant spas in the country, enhanced the success of the meeting.

On the evening of June 14, the Mayor and Mayoress of Cheltenham entertained the guests at the old town hall, and the mayor had kindly accepted to welcome the members at the opening meeting on the morning of the following day, when the institute held its annual business meeting, followed by the presidential address and by the Edward Williams Lecture. Seventeen papers were presented at the technical sessions, and a number of works visits were organized. Features of the social events were a performance of "Cymbeline" at the Shakespeare Memorial theatre, at Stratford-on-Avon, the annual banquet, and a supper and dance.

The report of the institute's activities in the past year disclosed that total membership Apr. 30, 1949 was 4380, compared with 4117 at the same date last year. Membership this year constitutes a record. Following presentation of the annual report, the following awards were announced by president R. B. Templeton, who was in the chair:

The Oliver Stubbs Gold Medal to G. L. Harbach, chief metallurgist of Worthington-Simpson Ltd., Newark, in recognition of his outstanding services by his work on the Technical council and other committees of the institute, and in presenting numerous papers of exceptionally high standard to many branches of the institute.

The E. J. Fox Gold Medal to Sir A. McCance, D. Sc., deputy chairman and joint managing director, Colvilles Ltd., Glasgow, in recognition of the eminent services he has rendered to the industry as an executive and as a scientist and metallurgist.

The Meritorious Services Medal was awarded to A. Sutcliffe, in recognition of the many years of service he has devoted to the industry and to the institute, which he joined in 1910. Mr. Sutcliffe has also devoted much of his activties to the encouragement of young people entering the foundry industry.

The British Foundry Medal to H. J. Young, works manager, at the Clyde foundry of Harland & Wolff Ltd., for his paper on "The Manufacture of Some Large Castings for Marine Engineering." Mr. Young was president of the Scottish branch of the institute in 1943.

Diplomas were awarded to the following authors of outstanding papers presented before the branches during the year:

To J. F. Barne and F. E. (*Please turn to page* 128)

N. P. NEWMAN

VINCENT C. FAULKNER

A. SUTCLIFFE

COLIN GRESTY

5974 Foundries in United States and Canada

THE number of foundries in the United States and Canada now totals 5974, according to statistics compiled from the 1949-50 edition of *Penton's Foundry List,* recently published by the Penton Publishing Co., Cleveland. This total represents a decrease of only 19 plants during the last two years, consisting of a loss of 48 in the U.S.A. and a gain of 29 in Canada.

Ohio, with 585 castings shops, continues the leading foundry state, followed closely in order by Pennsylvania, Illinois, California, New York, Michigan, Indiana, Massachusetts, Wisconsin and New Jersey. Ontario, with 289 plants, is the leading province, and if included among the first ten states, would rank seventh. No changes developed in the standing of these states since the previous study.

Distribution of Foundries in the United States and Canada

	Total Foundries 1949	Total Foundries 1947	Gray Iron Foundries 1949	Gray Iron Foundries 1947	Steel Foundries 1949	Steel Foundries 1947	Malleable Foundries 1949	Malleable Foundries 1947	Total Nonferrous Foundries 1949	Total Nonferrous Foundries 1947	Exclusive Nonferrous Foundries 1949	Nonferrous Dept. of Other Shops 1949	Brass & Bronze 1949	Aluminum Foundries 1949	Magnesium Foundries 1949	Centrifugal Casting Producers 1949	Permanent Mold Casting Producers 1949	Machine Shops 1949	Pattern Shops 1949	Laboratories 1949
Alabama	105	96	92	87	5	6	2	3	39	31	12	27	17	36	1	9	10	63	73	32
Arizona	6	7	5	4	1	1	...	...	4	5	1	3	2	3	...	...	1	1	3	2
Arkansas	17	16	13	13	1	...	...	...	7	7	3	4	5	7	...	...	3	13	13	2
California	422	432	147	163	32	37	3	2	300	296	248	52	205	264	14	24	77	203	262	96
Colorado	47	46	27	28	5	5	...	...	24	22	17	7	22	22	1	...	8	27	29	14
Connecticut	135	144	55	56	3	3	7	8	95	105	73	22	77	74	5	1	10	78	82	34
Delaware	10	11	4	5	3	3	1	2	5	7	3	2	5	3	...	...	...	7	8	8
District of Columbia	2	2	2	2	2	1	...	...	2	1	....	2	2	2	1	1	...	2	2	1
Florida	43	37	25	22	2	3	1	1	39	32	18	21	31	37	2	...	13	34	35	3
Georgia	78	80	61	69	4	4	...	1	39	40	13	26	37	35	...	1	4	56	61	14
Idaho	8	8	7	8	...	1	...	...	4	6	1	3	4	4	...	...	...	7	7	1
Illinois	452	436	207	209	32	30	20	19	248	246	201	47	174	219	15	11	44	205	287	145
Indiana	263	252	143	146	10	12	8	9	141	131	103	38	106	122	12	9	26	120	149	88
Iowa	95	91	65	68	1	1	1	1	51	43	27	24	30	47	...	2	6	43	63	31
Kansas	51	56	41	47	1	2	...	1	28	31	9	19	20	25	2	2	4	31	39	9
Kentucky	38	40	26	25	2	2	...	...	22	28	11	11	20	19	1	...	...	22	27	11
Louisiana	33	35	23	25	5	5	...	...	20	25	7	13	20	18	...	...	...	23	23	6
Maine	25	25	21	22	...	...	...	...	16	16	4	12	16	13	...	...	...	17	21	3
Maryland	40	50	21	31	2	2	1	1	27	31	16	11	26	21	...	3	1	30	31	11
Massachusetts	229	237	115	124	11	9	6	3	148	150	106	42	137	123	12	10	18	104	126	55
Michigan	383	398	188	198	26	28	12	10	211	234	170	41	163	171	13	20	46	191	207	145
Minnesota	106	111	67	75	3	4	1	1	56	59	34	22	44	51	3	1	11	46	69	37
Mississippi	10	10	10	10	...	...	...	...	5	3	....	5	5	2	...	...	...	7	7	1
Missouri	115	126	49	57	10	10	1	2	66	69	57	9	52	60	1	2	16	70	74	32
Montana	5	8	5	8	...	...	...	...	4	5	....	4	4	3	...	...	1	5	4	....
Nebraska	26	24	16	17	1	1	...	...	20	18	9	11	17	16	2	1	9	21	23	8
Nevada	3	4	1	3	1	1	...	...	2	3	....	2	2	1	...	...	1	2	2	....
New Hampshire	28	27	18	20	4	3	1	1	15	16	7	8	15	14	...	1	1	15	21	4
New Jersey	204	200	89	89	13	11	3	2	141	150	102	39	126	121	...	9	19	116	121	39
New Mexico	4	3	1	2	...	...	...	...	4	3	3	1	3	4	...	...	...	3	2	....
New York	388	405	174	189	23	22	13	14	270	278	188	82	221	235	15	20	37	227	268	116
North Carolina	67	69	56	65	...	...	...	...	41	44	11	30	35	39	...	...	3	39	44	....
North Dakota	3	3	3	3	...	...	...	...	3	2	....	3	2	3	...	...	...	1	1	....
Ohio	585	571	285	293	38	36	23	22	320	319	253	67	234	286	16	19	64	286	357	219
Oklahoma	42	37	28	26	1	1	...	...	23	19	13	10	16	22	...	1	...	27	32	6
Oregon	59	53	39	35	7	7	...	1	30	29	14	16	29	23	1	3	4	38	37	11
Pennsylvania	546	552	321	336	64	64	15	16	286	264	169	117	238	228	7	21	27	354	412	185
Rhode Island	40	40	17	17	...	...	3	1	24	23	21	3	22	23	1	1	1	9	15	6
South Carolina	24	25	22	24	...	...	...	...	18	16	2	16	17	13	...	...	1	20	23	2
South Dakota	3	3	3	3	...	...	...	...	2	2	....	2	1	2	...	...	1	3	2	....
Tennessee	77	82	68	71	3	3	...	...	38	44	9	29	31	32	1	1	5	51	65	18
Texas	133	140	75	78	11	9	1	1	91	95	50	41	77	76	3	6	16	81	97	31
Utah	18	21	13	18	2	1	...	...	10	13	3	7	9	8	1	...	...	5	11	3
Vermont	20	18	15	14	...	...	...	...	8	8	5	3	6	7	1	...	...	10	10	2
Virginia	68	70	61	62	5	5	...	...	47	45	6	41	41	40	1	2	7	46	55	15
Washington	81	87	44	47	16	17	2	1	58	62	30	28	48	53	4	3	12	46	57	19
West Virginia	39	38	23	23	2	2	1	1	26	26	12	14	22	17	...	3	2	27	25	11
Wisconsin	226	224	125	130	16	16	12	9	119	114	84	35	99	104	2	14	24	102	138	88
Wyoming	2	2	1	1	...	1	...	...	2	2	1	1	2	2	...	...	...	1	1	1
Total	5404	5452	2917	3068	368	369	138	133	3199	3218	2126	1073	2537	2750	138	201	533	2935	3521	1565
Alberta	22	19	17	16	2	3	1	1	19	13	5	14	16	18	1	...	1	14	16	4
British Columbia	57	59	37	41	10	9	2	3	42	39	18	24	36	35	1	1	5	31	41	12
Manitoba	22	19	15	15	2	3	...	...	13	12	6	7	9	12	...	...	1	18	18	6
New Brunswick	12	11	11	10	...	...	...	...	9	6	1	8	8	8	...	...	...	10	11	1
Newfoundland	3	4	3	4	1	1	...	...	2	3	....	2	2	2	...	...	...	3	3	1
Nova Scotia	25	24	20	22	1	2	...	...	18	19	2	16	18	13	...	...	1	19	19	3
Ontario	289	271	172	181	8	7	11	12	180	165	102	78	131	156	8	7	29	164	201	67
Prince Edward Island	3	2	3	2	...	...	...	...	1	1	....	1	1	1	...	...	...	2	2	....
Quebec	130	124	88	82	14	10	2	1	86	79	31	55	71	82	3	4	5	87	95	33
Saskatchewan	7	8	6	7	...	...	...	...	7	5	1	6	6	6	...	...	...	6	7	....
Total	570	541	372	380	38	35	16	17	377	342	166	211	298	333	13	12	42	354	413	127
U. S. & Canada	5974	5993	3289	3448	406	404	154	150	3576	3560	2292	1284	2835	3083	151	213	575	3289	3934	1692

FULL UTILIZATION KEY TO Materials

SKIDS, industrial trucks, hoists, and other material handling devices were busily engaged on the industrial scene when the present crop of materials handling experts were concerned more with toy darts and grade-school subjects than with flow charts and time-study surveys. Consultants and experts to the contrary, materials handling is less a dewy-eyed debutante fresh on the scene and more an antiquated dowager who has been around for some time.

Close to 125 years ago when Seth Boyden produced the first American malleable iron castings, he undoubtedly gave considerable thought to methods for handling the products of his Newark foundry; certainly, he was more than a little concerned with finding the best means for loading finished castings on horse-drawn delivery wagons and for insuring rapid and safe delivery to local customers and those in neighboring New York and Philadelphia.

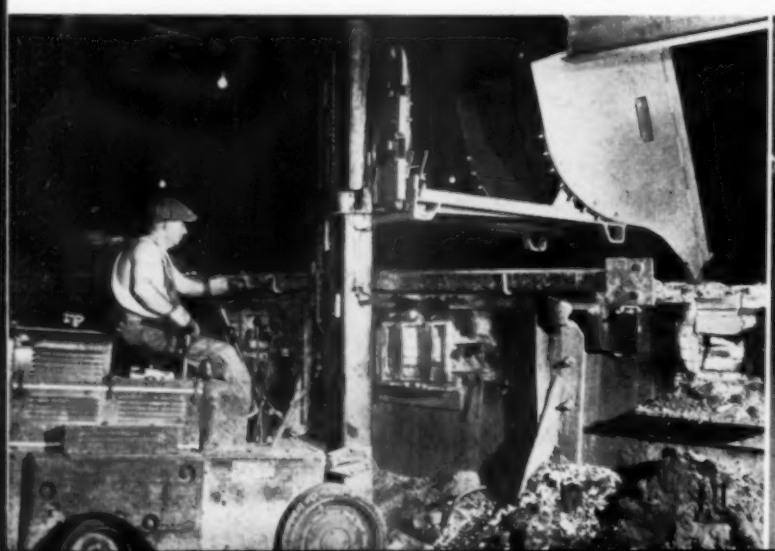
Although materials handling has in recent years been dignified with the prefix, "science of," the problems connected with this phase of foundry operations have seen few fundamental changes. The purpose of materials handling is still the efficient and rapid movement of materials and parts through storage, processing, and shipping; the goal of materials handling still is self-elimination. The truly effective program for materials handling seeks not to glamourize itself; instead it stigmatizes unnecessary handling and limits severely the degree to which materials need be handled.

Success in material handling is dependent in large measure on the vital factor of *utilization*. Specifically, good materials handling depends less on equipment and devices and more on thought applied to their application and use. Full utilization of materials handling equipment is far too rare. Certainly, if an industrial truck (capacity 3000 pounds) is employed a few hours daily to carry loads averaging less than a few hundred pounds, the vehicle is not being utilized fully. If, as is often the case, the truck stands idle while loads are handled manually, full utilization is far from a reality. If ladles are manually lifted, carried, and the contents poured into molds, materials handling is not at its highest level—especially if near at hand is an idle hoist which could be used for the job.

A case in point can be seen from the experiences of a midwest foundry in solving the problem of loading its rotary melting furnace. Previously, the scrap required for a single heat was shoveled by four men into six to eight buckets which then were wheeled from storage to furnace side and dumped. Additional manual labor was needed to carry the scrap into the furnace mouth. The same scrap had earlier been removed by hand from the plant's lathes and carried to the storage area. New metals and other charge ingredients also required many hours of difficult and costly manual labor.

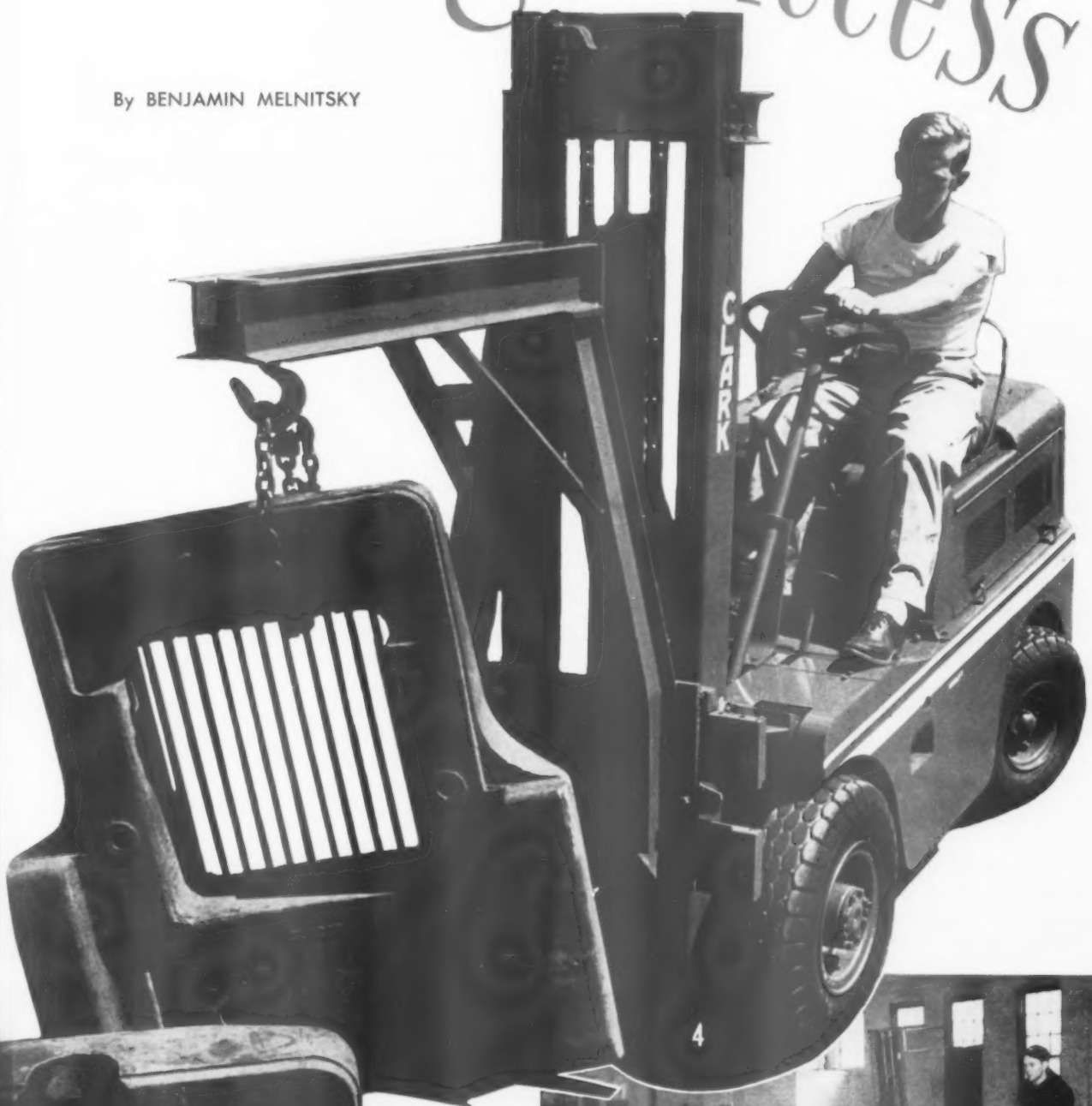
In general, here was a situation that can not be characterized as especially unusual. Equally as typical was the fact that available materials handling devices were not being used for these tasks. Utilization came about by the development of an ingenious bucket system designed to utilize the plant's fork lift trucks. The buckets were fabricated in such a manner that they could be lifted and carried by the

Fig. 1—Charging an air furnace with a fork truck carried dump hopper
Fig. 2—Shovel attachment used for handling scrap iron
Fig. 3—Scoop attachment with pusher for unloading is shown picking up bags of castings
Fig. 4—Crane attachment facilitates hoisting and moving heavy castings



Handling Success

By BENJAMIN MELNITSKY



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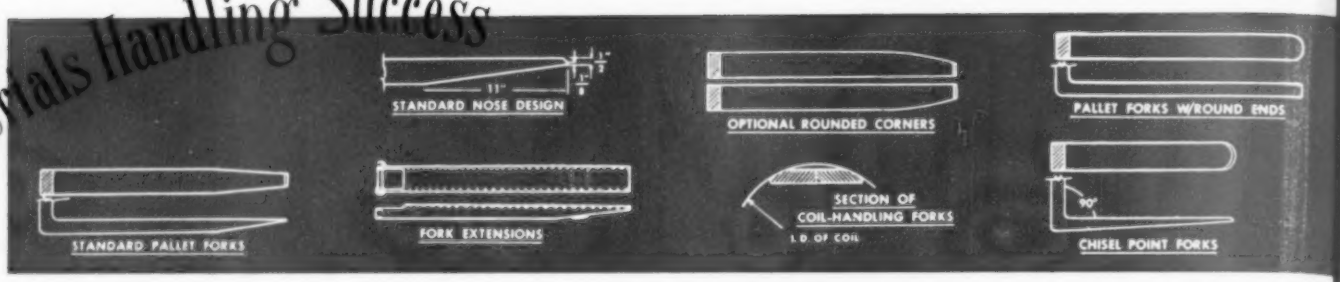

trucks and their load dumped by controls available to the driver. The receptacles are placed under the lathes to receive machine chips and other scrap. When loaded, the buckets are carried to storage by fork truck. These same buckets are used to store other ingredients of the furnace heat. When the furnace is ready for loading, the buckets are carried by fork lift truck and dumped into the furnace. This handling system cost a negligible amount of money; yet its use has resulted in a saving of 12 man-hours of labor daily and has reduced furnace charging time by 80 per cent. Fewer accidents, improved plant cleanliness and closer control of furnace ingredients are but a few of the extra dividends accruing to the plant. Here is utilization on a practical, sensible level.

In common with so many other materials handling problems, furnace loading is an operation for which special materials handling equipment would be impractical. Hence, when the fork truck completes the furnace job, it is free for other types of work in and around the foundry.

Dalton Foundries Inc., Warsaw, Ind., solved a similar furnace-loading problem by using a standard hopper designed for fork truck handling. Fig. 1 illustrates the use of this accessory in discharging scrap iron into the plant's air furnace. When not in use, the hopper is disengaged and the vehicle freed for other types of work. Here again, efficient materials handling was made possible by sensible utilization of existing equipment.

Figs. 2 and 9 taken at the Love Bros. plant in Aurora, Ill., demonstrate how cinders and scrap metal are handled mechanically with a simple accessory which replaces the forks of the truck. Still in the category of accessories which permit loading, carrying and then dumping is the special skid box shown in Fig. 5. This ingenious container has a hinged top which fastens to the truck in such a manner that the skid bottom drops down when the forks are lowered.

Variations of this type of accessory—designed to meet individual plant problems—may be purchased from truck manufacturers or can be constructed in the plant.

Using the fork truck as an example of how utilization in materials handling is possible, another excellent case history is to be seen in the experiences of an Ohio plant in handling castings to be shipped in bags holding 200 or more pounds each. Here again, available materials handling equipment could not be used. The loaded bags did not lend themselves to pallet handling in the shop and were to be shipped by rail without pallets. The result was manual loading of bags onto hand trucks, pushing trucks a distance of several hundred feet into the freight car, then piling the cumbersome bags in the car. While the 800 or so bags were being loaded in this manner, plant fork trucks stood idly by.

The truck was adapted to the job by replacing the fork with special scoop. The accessory shown in Fig. 3 consists of a scoop attachment plus a mechanical unloader. The truck is driven against the bags so that as many as ten are forced onto the scoop. The load is lifted and carried quickly into the freight car where the load is pushed off mechan-

Fig. 5—Special skid box permits dumping load without tilting skid

Fig. 6—Ladle of molten metal is carried from furnace to pouring area on a three-wheel buggy. Special hoist attachment then lifts pot from buggy and brings it to proper height for pouring

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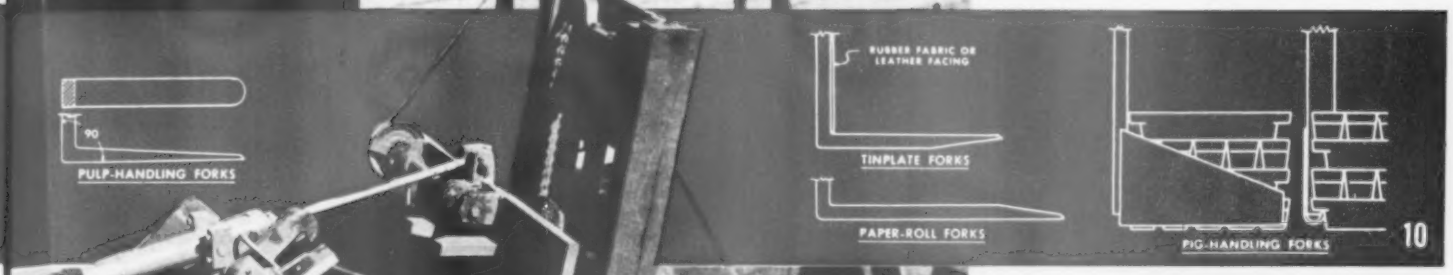
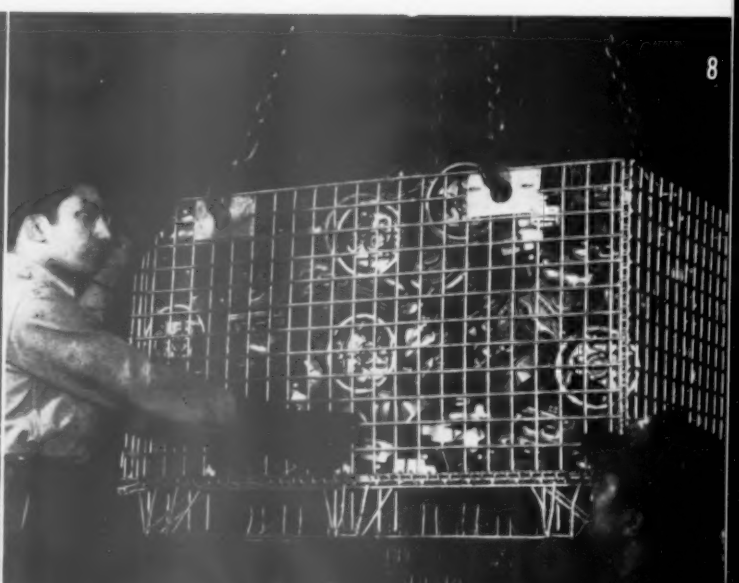


Fig. 9—Dump shovel attachment carries 10 cu ft of cinders in one load

Fig. 10—Group of lift truck forks for special applications

Fig. 7—Special clamp used in conjunction with an electric hoist handles core molds

Fig. 8—Wire skid boxes have special receptacles designed to receive hooks of hoists or cranes



ically by the unloader. Here again full utilization of materials handling equipment was made possible by the application of ingenuity plus a few dollars for equipment.

Another of the major accessories is the crane attachment illustrated in Fig. 4 where it is being used to haul heavy counterweight castings. In foundries where yard cranes are lacking, this same job would require the use of industrial trucks plus considerable manual labor. The illustrated crane attachment is removable when not in use and can be replaced with conventional forks when plant conditions dictate such a move. Other hoisting accessories include booms which swing right and left, permitting the truck to lift loads at either side. Still others are fixtures which are clamped in place between the forks of the truck to provide a lifting action. Variations include grips, grabs, grapples, and special hooking devices attached to the crane attachment or positioned in some other manner.

In this utilization phase of materials handling the forks themselves can be changed as sketched in Fig. 10. For loads that overhang, special fork extensions which fit over the regular forks are available. These are of special value in narrowing the gap between the average truck load and the vehicle's rated capacity. A variation of this is an extremely simple sling arrangement so designed that one section of the chain hooks onto the frame of the truck and the other to the front of the load. Unusually long loads can be carried in this manner on the short forks of the average truck. Special forks for handling metal pigs and for other purposes are indicated in Fig. 10.

What has been said for the fork lift truck concerning utilization applies equally to all other material

Fig. 11—Skid boxes are stacked neatly by lift truck

Fig. 12—Lift truck positions a skid bin

Fig. 13—Application of special loading methods for pallet handling of castings

Fig. 14—Fork truck handles two skid boxes

handling devices, especially cranes, hoists, and other lift-carry-drop types of equipment. Lacking accessories, the factor of utilization for a hoist or crane is very close to zero. Unless used in conjunction with slings, hooks, grabs, or other accessories, a 50-ton capacity crane is unable to lift even a 50-pound casting. In the foundry the hoisting equipment has almost unlimited applicability, provided full use is made of accessories. As shown in Fig. 6, the task of pouring molten metal into molds can be simplified and made considerably safer by use of the special fixture demonstrated.

Perhaps the most useful, and far too frequently neglected, utilization-increasing accessory is the clamp. Frequently when an object can not be handled mechanically by means of slings, chains, special fixtures, and the like, it is discovered that tongs, grabs, grapples, and other means for clamping to the slides of the object provide a satisfactory answer. Fig. 7, taken at the Wright Aeronautical Corp., Woodridge, N. J., plant illustrates one type of clamping accessory. Utilizing the principle of the ice tong, these fixtures and accessories are practically without number and certainly too numerous and diverse for classification. A good general rule is: If all else fails and mechanical handling seems out of the question, look to the clamping devices. In actual practice, everything from 15,000 pound steel ingots to ice cubes are handled by clamping mechanisms.

Another frequently-overlooked area for increasing work output of hoisting equipment is in the handling of pallets, skids, and skid boxes. The obvious means for doing so are illustrated in Figs. 8 and 11 where provisions have been made for hoist handling of skids. Not only can the crane or hoist relieve the fork truck of the skid-moving job, but hoisting equipment also can be utilized for stacking skids and skid boxes as shown in Fig. 11 by using pallets with overhanging tops or with hook receptacles at all four corners, the hoist or crane can be adapted for pallet handling as well. Even conventional pallets can be handled by hoisting equipment if two special rods are used. These have hooked ends to receive the sling hooks and are positioned under floorboards of the pallet an equal distance from the center. In many instances palletization in the foundry has (*Please turn to Page* 234)

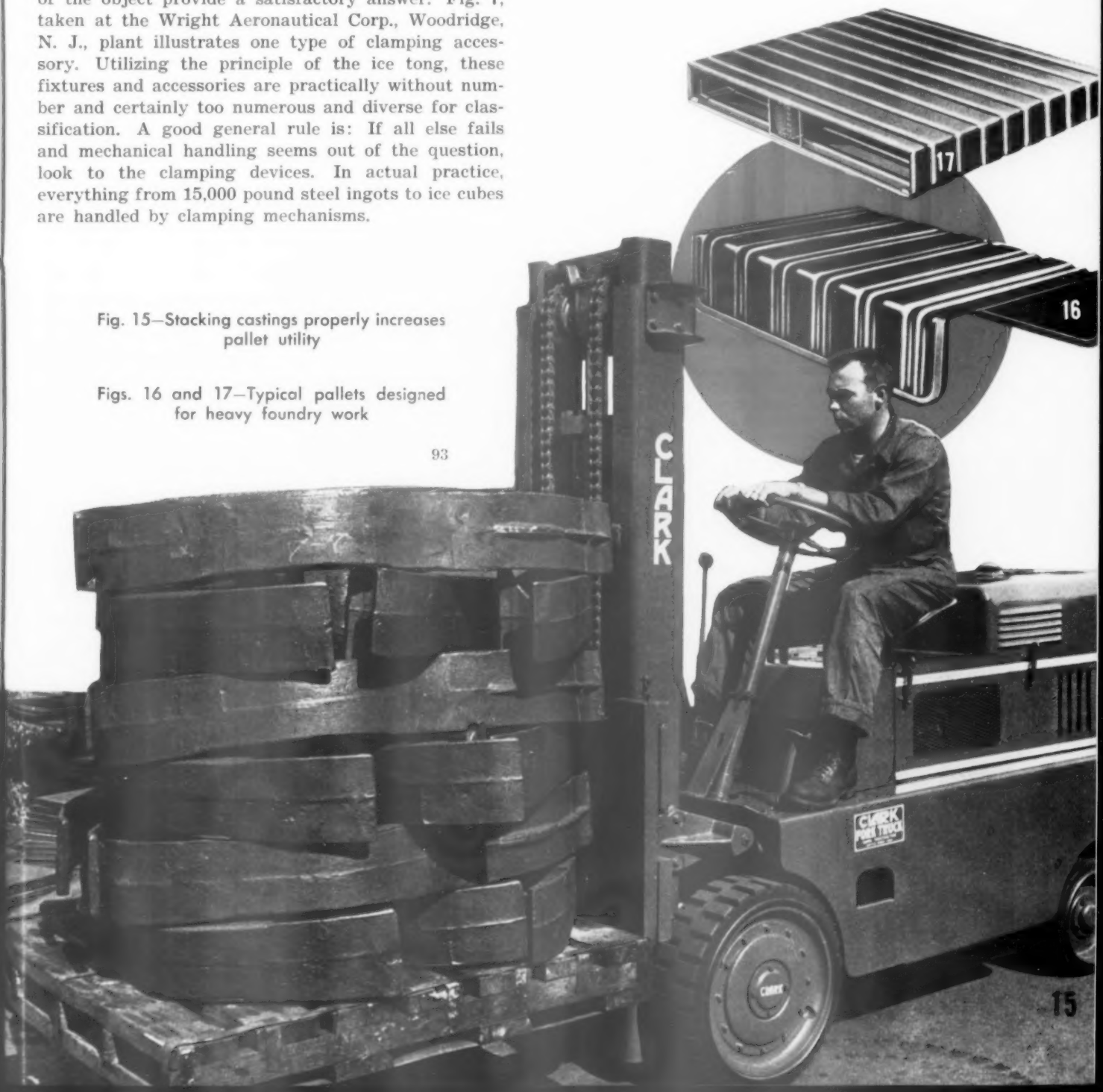


Fig. 15—Stacking castings properly increases pallet utility

Figs. 16 and 17—Typical pallets designed for heavy foundry work

52nd Annual Meeting Held by A·S·T·M

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

J. G. MORROW
President

NEARLY 1900 attended the 52nd annual meeting of the American Society for Testing Materials held at Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., June 27 to July 1. At a luncheon session held on June 28 R. L. Templin, Aluminum Co. of America, New Kensington, Pa., and retiring president of the society, presented an address on "Progress of ASTM." New officers introduced included the president, J. G. Morrow, Steel Co. of Canada Ltd., Hamilton, Ont.; vice president, Frank E. Richart, University of Illinois, Urbana, Ill.; and directors, Robert D. Bonney, Congoleum-Nairn Inc., Kearny, N. J.; Claire H. Fellows, Detroit Edison Co., Detroit; Harrison F. Gonnerman, Portland Cement Association, Chicago; Norman F. Mochel, Westinghouse Electric Corp., Philadelphia, and M. O. Withey, University of Wisconsin, Madison, Wis.

At the Tuesday evening session, June 28, William M. Baldwin Jr., Case Institute of Technology, Cleveland, presented the 23rd Marburg lecture on "Residual Stresses in Metals" in which he described how those stresses are developed; the differences in mechanisms of cold working, heat treatment, casting and welding in causing residual stresses; experimental methods of determining such stresses, and methods of eliminating them. Following the lecture the Charles B. Dudley medal was presented to W. W. Buechner, R. J. Van de Graaff, H. Feshbach, and A. Sperduto, all with Massachusetts Institute of Technology, and E. A. Burrill and L. R. McIntosh, High Voltage Engineering Corp., Cambridge, Mass., for their paper "An Investigation of Radiography in the Range from 0.5 to 2.5 Million Volts."

The Richard L. Templin award was presented to W. T. Lankford, Carnegie-Illinois Steel Corp., Pittsburgh, for his paper on "Hydraulic Bulge Testing of Sheet Metals," and V. M. Darsey and W. R. Cavanaugh, Parker Rust Proof Co., Detroit, received the Sam Tour award for their paper "Apparatus and Factors in Salt Fog Testing."

On June 29 an all-day session was devoted to a "Symposium of Testing Cast Iron with SR-4 Type of Gage," and 12 papers on the subject were presented. Meeting was opened with the presentation of the report of Committee A-3 by James A. Vanick, International Nickel Co. Inc., New York, acting chairman. Committee recommended expansion of Standard Specifications for Automotive Gray Iron Castings (A 159-47) to include two new alloys, designated Nos. 113 and 114, and that the specifications be reverted to tentative. New alloys are for brake drums and clutch plates, and the specifications include data on chemical, physical and structural requirements. The committee also recommended continuation of Standard Specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings (A 126-42), and Tentative Specifications for Foundry Pig Iron (A 43-45T), and for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 F (A 278-44T), as well as Tentative Method of Compression Testing of Cast Iron (A 256-46T). The committee is sponsoring a "Symposium on the Properties, Testing and Use of Gray Iron" to be held at the ASTM Pacific area national meeting in San Francisco in October.

In the symposium on use of electrical strain resistance gages, their application to determine residual stresses resulting from casting or other strains was described. How those stresses were eliminated or reduced to a low value was discussed. Martin A. Erickson, Chrysler Corp., Detroit, in a paper "Stress Analysis of Automotive Cylinder Blocks" discussed the use of strain gages in determining the cause of failure in an experimental cylinder block.

R. J. King, Caterpillar Tractor Co., Peoria, Ill., employed strain gages in determining the residual stresses in tractor cylinder blocks designed for wet-type liners, and found trouble with cracking was eliminated by change in design at the lower end of the block. He also stated that foundry practice apparently had no effect in creating or alleviating residual stresses. This may be due to the fact that it could not be controlled precisely (*Please turn to Page* 120)

By HAROLD J. ROAST

The Bronze Foundry
SET TO MUSIC

THOSE of us who work in the heat and strain of the foundry may see little of poetry therein, and a poet is not perhaps the most likely person on whom to call for an accurate description of foundry work. And yet we have an example in Schiller's "Lay of the Bell" that is accurate as to foundry procedure and metallurgy, and has been set to music in a most pleasing manner by Romberg.

It is a good thing for the foundryman to take time off to ponder, once in a while, on the beauty as well as the utility of his labor.

The "Lay of the Bell" written at the beginning of the eighteenth century deals with the founding of a bronze bell up to its final completion when it is ready to speak on the occasion of man's joy and sorrow in times alike of peace and disaster.

Schiller while writing the poem paid many visits to foundries and, as his poem shows, assimilated thoroughly the essentials of bell making. The scene opens with the foundrymen grouped in the foundry around the bell mold that has been prepared for the casting.

Lay of the Bell... Schiller

"In the earth right firmly planted
Stands, well bak'd, the mould of clay:
Up my comrades, be ye helpful;
Let the bell be born to-day.
From the brows of all
Will the toil drop fall;
So shall praise for skill attend us;
Yet its blessing Heaven must send us."

"The labour we prepare in earnest
Is suited well by earnest words;
More briskly all our work advances,
When frank discourse its aid affords.
So let us now with care consider
What from our feeble strength may rise;
Disdain one must the foolish workman,
Who brings no thought to what he tries.
Reflection human nature graces;
For this the gift to understand,
That man within the heart should ponder
What he creates with cunning hand."

(The key words here seem to be "co-operation," and "pride in one's work." Is it not true that the best in creative art, and surely founding comes under this classification, comes from within man's heart, rather than from his muscles, as Longfellow says in "The Building of the Ship" . . . *"For his heart was in his work and the heart giveth grace unto every Art."* We then come to the melting of the bronze tin-copper alloy):

"Take for wood the stems of pine-trees,
Of the driest let them be,
That by flames compress'd the furnace
Thro' its mouth may stricken be.
Cast the copper in,
Quickly add the tin;
That the metals, else unbending,
As they flow be rightly blending.
What, in the earth profoundly hidden,
By aid of fire we fashion thus,
High in the belfry tow'r suspended
Shall sounding witness bear of us."

(Here we have the alloying of copper and tin and the need for a thoroughly hot furnace. Now comes the fluxing of the molten metal to eliminate the dross):

"Silv'ry bubbles, upward rising,
That the mass is melting shew;
Let us now these salts commingle,
That thereby we speed the flow.
And from foulness free
Must the fusion be,
That by metal purely founded
Pure and perfect tones be sounded."

(Then comes the temperature test, with pipe of clay in place of pyrometer):

"Even now the vents are browning;
Let me dip this clay pipe in;
If as glass we see it shining,
Then the casting may begin.
Haste, my comrades, haste,
This our fusion test;
Happy omen, prove ye whether
Hard and soft combine together."

(The metal is now ready for pouring):

"For the casting all is ready,
Fairly dented is the breach.
Yet before we free the metal,
Let a prayer be said by each.
Now release the flood!
God to us be good!
Fiery waves thro' vapour gushing,
Down their destin'd course are rushing!

"While the bell is slowly cooling,
From your anxious labour rest;
Like the birds 'mid leaves that frolic,
Choose what sport may please you best.
When the stars appear
Then may workmen hear,
Duty done, the vesper sounding;
Masters toil is still surrounding.'"

(And now has come the time to open up the mold):

"Let the fabric now be broken,
For its purpose is fulfill'd,
So that heart and eye may feast them
On the goodly form conceal'd.
Let the hammer swing,
Till the cover spring!
Nought the buried bell releases,
But to break the mould in pieces."

(At last the casting itself is seen):

"Heaven has made our work to prosper,
Like a star, the sky that decks,
From the husk, in bright perfection,
See the metal kernel breaks.
Neck and crown and bow
As in sunlight glow;
E'en the scutcheon's clear impression
Makes of plastic art confession.
Come in! Come in!
And let us comrades round her pressing,
Upon our bell invoke a blessing.
"Concordia", let her name be called:
In concord and in love of one another,
Where'er she sound, may brother meet with brother."

Such is the poet's description of the making of a bronze casting in the beginning of the eighteenth century, and bell founding today has departed but little from the general procedure of that time.

Questions AND A

Melting Steel Scrap Charges

Q.—A customer having a large quantity of hot rolled mild steel, SAE 1020, wants to know if we could use this in our cupola and make him some weights. While it is common practice for us to use steel rails in our regular mixtures, we are not familiar with practice or effects of melting exclusively our customers' steel scrap.

A.—While you do not mention the form your customer's steel scrap is in, we assume that it is light sheet clippings or trimmings left after a part has been stamped or punched out. Such material is bulky, and will result in high oxidation losses. We believe that the best procedure would be to melt that material following your regular heat. At that time the cupola will be hot, and probably less oxidation will be encountered. Since the steel is low in carbon, an additional amount of coke must be added to the splits usually employed, and as a guess would say from 20 to 25 per cent more.

You do not mention the size of the weights to be poured, or if any machining of them is contemplated. If they are large, the iron probably could be poured into them, but if they are small or medium in size, and machining operations such as boring or turning are involved, additions of silicon as silvery pig, silicon briquets, or ferrosilicon must be made to provide a gray structure.

Galvanizing of Iron Castings

Q.—We are contemplating the galvanizing of a gray iron casting weighing approximately 15 lb; section thickness averaging about 1 in. Desiring to do the job properly at the minimum cost, we are looking for definite information on the subject.

A.—If you have only one casting you desire to galvanize, it will be much more economical to send it to a jobbing shop which specializes in that type of work. To do the job yourself will require a zinc kettle or pot of sufficient size to permit immersion of the casting, pickling tubs and hydrochloric acid, or hot salt baths and the necessary salts, etc.

In the hot-dip galvanizing method the castings are cleaned preferably by abrasive blasting to remove all the sand, etc., and then dipped in an acid pickle composed of 50 per cent hydrochloric (muriatic) acid and 50 per cent water. Casting is removed and dried by heating before going through remaining steps.

In the salt bath method of preparation, the casting is immersed in molten salts which remove the surface graphite through oxidation, and leave a surface which can be galvanized or tinned readily. Casting is dipped in molten zinc maintained at about 800° F. Bath is covered with sal ammoniac to which a little glycerine is added to thicken it. Casting is immersed through the flux, held in the bath, moving it around, until it reaches the temperature of the zinc. Then it is drawn up through a cleared space in the flux made by a skimmer, and the excess zinc shaken off. Large castings may be dipped in water to provide a shiny surface while the same result can be obtained with light castings by brushing lightly with a brush dipped in clean water.

Holes Result From Gassy Iron

Q.—We are sending you a small wheel casting 9 in. diam with a 2¼-in. face which is full of blowholes. This is a condition we find once in a while, and are at a loss to explain. These castings were poured at the end of the heat under the same condition as all the rest of the castings, but this defect just showed up in a couple of wheels. Metal is melted in a 15-in. cupola using a mixture of 15 lb pig iron and 90 lb mixed light scrap with 15 lb coke. Metal is quite hot and nearly always the results are good. We usually melt 2000 to 2500 lb per heat, but have this porous condition crop up only in a few castings occasionally.

A.—Appearance of the holes, none of which reach to the surface of the casting submitted for examination, lead us to the opinion that they are caused by gas absorbed by the iron. The holes have bright shiny surfaces and some of them show small globules attached to their surfaces. While not available, we imagine that the gates and risers on the casting showed considerable "mushrooming" or bulging on the upper surface.

The numerous holes and the size of them indicates that the iron was badly gassed, and the question arises as to the source of the gas. One possibility is that the bed was too low. Perhaps the last charge was placed in position without the necessary coke split on top of the preceding charge. Again it might be an improperly dried ladle, or one in which some patching of the lip was done to permit finishing up the day's pouring. Such patches should be dried thoroughly before the iron is allowed to run over them, but too many times the pourer just slaps on a little

ANSWERS

mud, and proceeds with pouring.

Result is that the steam created by the hot metal flowing over the moist patch is picked up by the molten metal, and carried into the casting cavity. As the metal begins to cool, the gas is ejected from solution, but cannot escape due to the skin formed almost the instant the metal strikes the comparatively cold sand. Consequently, the holes usually are located just under the surface of the casting. In cases where the metal contains considerable gas, it is squeezed back through the remaining liquid metal to the gates and risers, and causes them to bulge or "mushroom" at the top. In some instances the force of ejection is sufficient to throw metal out of those portions.

Construction of Small Cupola

Q.—We are interested in rigging up a small cupola to handle heats up to 3000 lb, and we have been told that it is possible to use an oil drum for that purpose. We will appreciate any advice or information.

A.—While a number of foundrymen have constructed small cupolas such as you have in mind, we believe that you would be much further ahead by purchasing the smallest size commercially made by cupola manufacturers. While that size is usually lined to 18 in., and melts around 2000 lb per hour, the thickness of the lining can be increased to provide a slower melting rate if so desired.

If you decide that you want to go ahead with making a cupola you will need at least two or three oil drums which are fastened together to form the shaft or shell. If the drums are the 110-gal size they will be about 29 in. in diam and 43 in. high. The lining should be at least 4 in. thick which would give an inside diam of about 20 in. and a melting rate of about 1½ to 2 tons per hour. Cupola should have four tuyeres with a total area of about 60 sq. in. which can be taken care of by making each tuyere 3 x 5 in. or 4 in. in diam.

Height of the tuyeres above the sand bottom will depend upon the amount of iron to be held in the well or reservoir, and may vary from 4 to 10 in. Spout for tapping the iron from the cupola is located midway between two of the tuyeres, and at the level of the sand bottom. Slag hole is located diametrically opposite, and two or three inches below the bottoms of the tuyeres. Bed in the cupola should extend about 36 in. above the tops of the tuyeres; the coke splits between charges should be 25 lb, and the iron charges based on that—for example with a 6 to 1 iron to coke ratio the iron charge would be 150 lb while with an 8 to 1 ratio the iron weight would be 200 lb. Air supply should be about 850 cfm through the tuyeres.

Since in the brief confines of this description of the cupola we can only touch upon a few of the details needed for construction, we suggest that you obtain a copy of the AFS *Handbook of Cupola Operation*. This volume will supply all details of cupola construction as well as that required for successful operation.

Aluminum Color in Oxide Skin

Q.—Recently we have seen colored aluminum vases, tumblers, trays, etc., in department and other stores, and were told that they were colored all the way through. We doubt that statement, and would like to know how the coloring is accomplished.

A.—As you indicate, the statement of the aluminum alloy being colored all the way through is incorrect. It actually is only "skin deep" since the color is developed in the oxide skin or coating on the aluminum. In this type of work, the oxide coating usually is produced by electrochemical means, more commonly described by the term "anodizing" wherein the part is made the anode in a dilute bath of sulphuric acid, chromic acid, oxalic acid, etc. The oxide coating then is impregnated with organic dyes or combinations of those to obtain the desired color. In some cases certain addition agents in the anodizing bath will produce colors. Colors also may be developed by

GANGWAY! By J. A. PATTERSON

"I told you that you and that damn midget car were goin' to run underneath me once too often!"

Questions AND ANSWERS

applying heavy metal salts such as lead and cobalt nitrates, zinc acetate and potassium dichromate, potassium ferrocyanide and ferric chloride, etc., to the oxide skin. After treatment the color is sealed by immersion in hot water, treatment with sodium or potassium chromates, or nickel or cobalt acetate solutions.

Permanent Mold For Bearings

Q.—We are interested in making cast iron permanent molds for casting brass bearings. Your publication *Gates and Risers for Castings* has been of considerable help, but there is no mention of the proper shrinkage allowance for brass castings made in permanent molds.

A.—The article by Henry Marius on pages 144 and 145, *Gates and Risers for Castings* and first published in THE FOUNDRY, Jan. 1, 1930, contains practically all the information required for the production of permanent molds for bearings. So far as shrinkage allowance is concerned, metals shrink to the same extent whether cast in a sand mold or a metal mold. In this particular instance the standard brass allowance is ¼-in. to the foot. In certain instances where normal contraction is hindered by dry sand cores on the inside, or flanges or other projections on the outside, the shrinkage allowance is reduced. The actual amount of reduction usually is determined by experiment. Expert knowledge along this line can be gained only through experience.

Molds for Plastics Injection

Q.—We are interested in obtaining information on beryllium-copper alloy used in making molds for plastic injection molding. We would like to know the composition and characteristics which make it serviceable. Would not chromium plated bronze make a good mold material for small objects on short runs?

A.—It is our understanding that the beryllium copper alloy used for molds such as you contemplate, as well as for other uses, is one containing 2 to 2.5 per cent beryllium The advantage is that it can be cast to form as compared to steel, and it can be heat treated to obtain relatively high hardness. According to our information injection molds usually are constructed with a cavity holder or chase plate made of steel which permits the cavity to be made of "softer" metals even though high pressures are exerted on the molding material since those are concentrated along narrow land or cut-off areas of the mold.

In a book *Molding Technique for Bakelite and Vinylite Plastics* published by the Bakelite Corp., New York, it further states that while cavities made of soft metal have a tendency to scratch easily and distort slightly, they are being used successfully on many jobs. Beryllium-copper, brass and bronze which can be cast as cavities, provide an inexpensive way of duplicating molds. Electrodeposited alloys sprayed with metal backing have been used successfully where highly polished surfaces are required.

Delmonte in his book *Plastics in Engineering* mentions the use of beryllium-copper for experimental and small production runs as well as cast hard zinc alloy molds which were chromium plated, and precision-cast molds which require the minimum finishing before putting in use.

Wants To Make Large Griddle

Q.—We have an inquiry to produce a large gray iron hotplate griddle. Size of the plate is 32 x 72 in. and will be heated by eight gas burners individually controlled. Since any or all of the burners may be in operation at one time, we would like to know whether those conditions might result in the plate cracking due to uneven heat distribution. What composition would you recommend for such a plate?

A.—Producing a plate of the size you mention which will be flat and free from casting strains will be somewhat of a problem since you undoubtedly will want to make it as thin as possible so that it will heat through in the minimum time. Possibly a high total carbon iron with a silicon content suitable for the thickness involved would serve satisfactorily, but without any previous experience in producing such castings, it is possible that you might run into trouble with warping or cracking. We believe that it would be advisable to heat treat or anneal the plate at 900 to 1000° F with slow cooling previous to machining or grinding operations to relieve any possible casting strains.

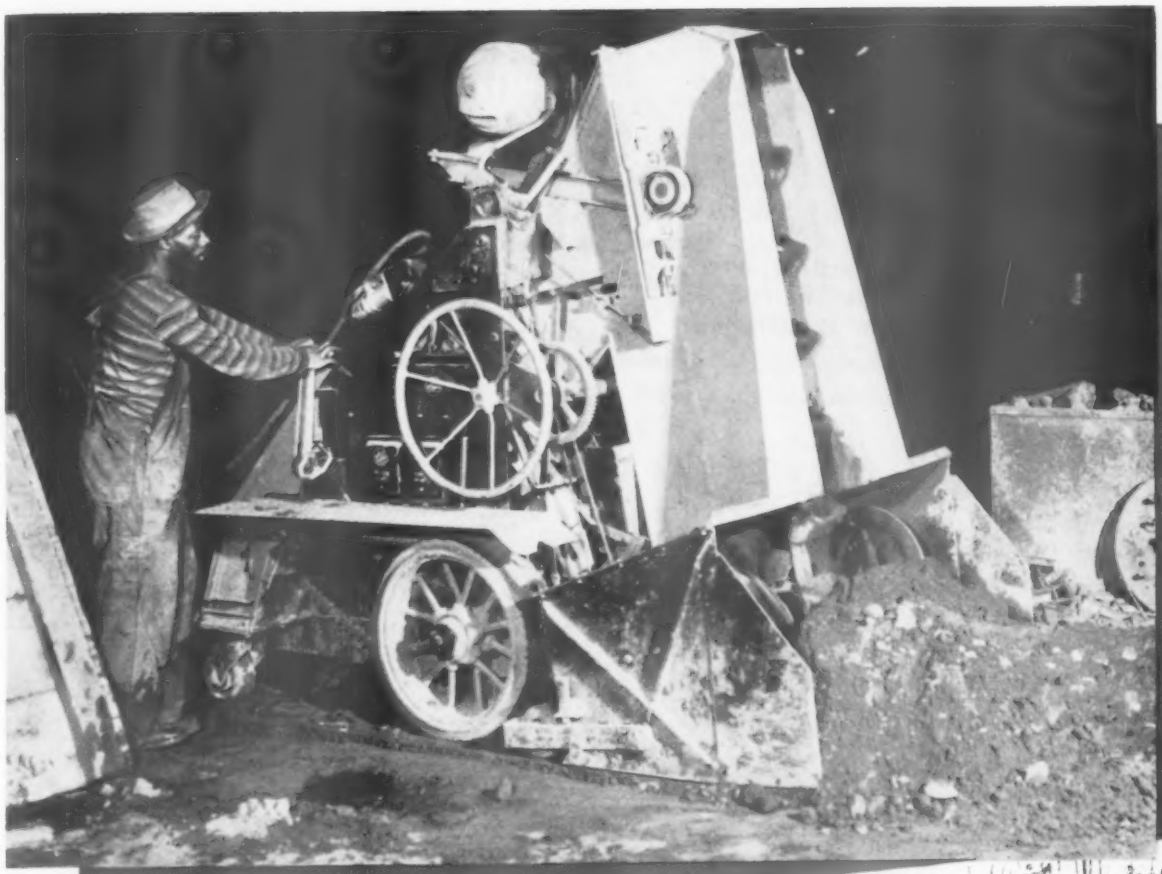
However, we believe that for the purpose, you will find that an austenitic type iron containing around 20 per cent nickel and 3 per cent chromium in addition to the usual elements will provide greater heat and corrosion resistance. That material has given excellent service in stove or range tops which receive hard usuage in hotel and restaurant service.

Chunky Castings Hard To Make

Q.—We are forwarding a small chunky casting weighing about 4½ lb which has been cut in half and shows a defect in the center. We have six of these patterns on a board and the customer orders castings solid, and with various size bores. We have no trouble with the castings which are cored to form the holes or bores, but those cast solid show the hollow place in the center when drilled. Our analysis from this type of casting indicates 2.22 per cent Si, 0.63 per cent Mn, 0.43 per cent P, 0.08 per cent S, 3.16 per cent GC, and 0.38 per cent CC. We have tried various methods of gating and pouring these castings but have not been able to overcome the defect. Can you make any suggestions?

A.—Chunky, solid castings always are the hardest to make, due to the difficulty in feeding, unless exceptionally heavy gates and risers are employed. While you mention that you have tried various methods of gating, you did not indicate what procedures had been tried. It appears to us that gating into risers close to the castings with gates almost the

(*Concluded on page* 100)



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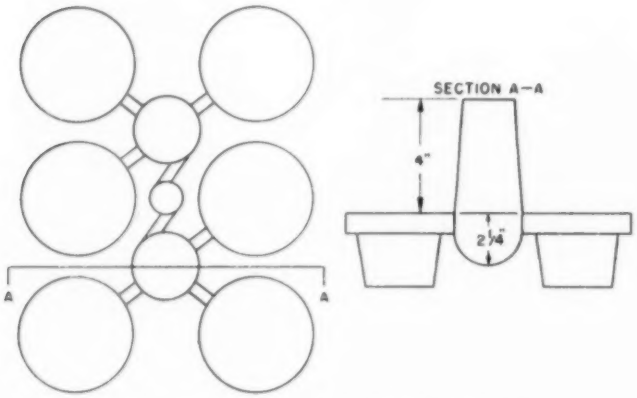
FOREMOST IN SAND CONDITIONING EQUIPMENT

Questions AND ANSWERS

(*Concluded from page* 98)

thickness of the flange portion of the casting should give good results. Naturally a gate that size may be somewhat difficult to remove without breaking out



Method of gating to obtain solid castings

part of the flange, but use of a thin cut-off core with a smaller opening will reduce trouble from that source.

Our suggestion for making the castings solid is contained in the accompanying sketch showing the application of two risers or blind shrink bobs, depending upon the height of the cope. Both risers or bobs are fed from a single sprue. Gates or runners from sprue which is 1-in. diam are wedge type 1 in. high, ⅜-in. wide at the top and ¼-in. wide at bottom. These lead tangentially into the risers as indicated. The risers are 2¼ in. diam and extend at least 4 in. above the joint line and 2¼ in. below. The latter is important to provide proper feeding. Gates into the casting cavity may be from ½ to ¾-in. square.

High Manganese Castings Crack

Q.—In our foundry, located in South Africa, we produce a large quantity of austenitic manganese steel castings. We are experiencing considerable difficulty with certain types, due to development of cracks, generally after the quenching treatment and frequently after the castings have been in service for a period. Types of castings usually are heavy items such as gyratory crusher mantles, large jaw crusher plates, ball mill liners, etc. Apart from individual cracks, the toughness characteristic of the metal is evident, and invariably the fracture is homogeneous and free of porosity, with a microsection showing good austenitic structure free of oxides. Cracked castings cannot be associated with particular melts to any extent, and for no apparent reason one or two from a heat of otherwise sound castings will crack. Steel is basic electric with composition kept strictly to the limits of 12 to 14 per cent Mn, and with carbon not exeeeding 0.10 of the Mn. Heat treatment charges are 5 to 6 tons in weight, loaded cold and tilted into a deep tank of cold water with the inlet valve kept open. Furnace temperature is controlled and kept at 1050° C.

A.—Austenitic steel castings of heavy section always are prone to crack internally, either in cooling off after pouring, in heating up in the heat treatment furnaces, or in the quenching bath. Cracks in many cases are entirely internal and do not show on the outside of the castings when taken from the water. However, they spread quite rapidly in service, reaching the surface of the piece usually in a matter of days and cause it to break apart.

In many cases castings of this type must not be allowed to cool below dark red heat before being charged into the heat treating furnace. If charged at a black heat, the furnace should be brought to temperature slowly to avoid heating up the outer layers of the castings faster than the inside, and so setting up stresses that tend to cause cracks. The charge in the furnace should be piled so that the heat will get to all parts of the furnace charge as evenly as possible. When heavy castings form part of the charge, it is better to remove them from the furnace one at a time for quenching, rather than dumping the whole load at once. If the latter practice is followed, some of the castings may get buried under the heap in such a way that parts of them cool rapidly and parts slowly, thus setting up stresses.

Even with all these precautions, austenitic manganese steel castings with sections over 5 in. or at most 6 in. are very hard to produce free from internal cracks. The design usually is so managed, by coring out the back of the pieces as much as possible, as to hold the sections to a minimum of 5 in. Really heavy pieces in regular Hadfield type manganese steel simply cannot be produced without having internal cracks.

The composition of the steel should also be kept to definite limits when heavy pieces are to be poured in a heat. The ratio of carbon to manganese of 1 to 10 is all right for pieces of moderate thickness, but, for heavy sections, the carbon should not be allowed to exceed 1.30 per cent, and if possible 1.20 per cent, regardless of the manganese. If the manganese is 14 per cent, and the carbon 1.40 per cent as called for by the 1 to 10 ratio, the likelihood to the formation of internal cracks is increased greatly.

In handling manganese steel castings it always must be kept in mind that they have a very high coefficient of thermal expansion and at the same time a low thermal conductivity. In heating the castings in the furnaces, therefore, if they are brought up to heat as rapidly as is possible with ordinary steel pieces, the outside gets hot very much faster than the inside, and expands much more than if ordinary carbon steel were being heated. The obvious result is that heavy stresses are set up in the section which may result in a crack being formed. In cooling off the reverse condition is set up, the outside cooling rapidly and contracting greatly while the inside is still hot and expanded. Later contraction of the inner parts of the piece is then the cause of the cracks being formed in the inside portions of the castings.

Suppose your foundry employed less than 100 . . .

If your foundry employed less than 100 workers, would you unload annealing cars with a sling—or with a magnet?

The profitable answer to this question is determined neither by size of your plant nor investment involved. Consider, instead, your *total* unloading time. Fully 50% of it is consumed in attaching and removing wire or chain slings from castings.

With an Ohio Magnet, however, you lift *instantly*. There's no lost time before and after the move. The man-hours you save pay for magnet cost in a few short months.

Save time . . . save money by turning costly man-hours into profitable magnet-minutes. Write to Ohio—*25 years a leader in magnetic materials handling.*

How would you unload annealing cars?

SELECT YOUR MAGNET from two Ohio types. The PROTECTO-WELD magnet, shown above, is made in 39, 46, 55 and 65-inch diameters. Bolted construction types include these and other smaller sizes. Ohio also builds magnet control equipment.

5 TYPICAL JOBS WHERE OHIO MAGNETS CUT COSTS

- unloading scrap, rails and pig iron.
- loading charging cars, hoppers and buckets.
- loading and unloading annealing cars.
- moving bulky castings in cleaning dept.
- picking up sprues, gates, runners, overflow.

THE OHIO ELECTRIC MFG. CO. • 5900 MAURICE AVENUE • CLEVELAND 4, OHIO

Ohio MAGNETS

A-2029

Men OF INDUSTRY

WILLIAM G. MIXER, general foundry superintendent Buick Motor Division, General Motors Corp., Flint, Mich., has retired and plans to enter the consulting field specializing in production foundry procedure. Mr. Mixer, a graduate of Stevens Institute of Technology, has been associated with the Buick Motor Division for over 29 years, where he has acted in various capacities from standards to management. He was appointed foundry superintendent in 1941. In 1945 he was given the Stevens Institute Award of Merit medal for successful operation of the Buick Aluminum Foundry during the war.

♦ ♦ ♦

Roger W. Batchelder has been appointed vice president in charge of sales, National Bearing Division, American Brake Shoe Co., New York. Mr. Batchelder, who attended Yale University, became associated with American Brake Shoe Co. in 1933, served as purchasing agent of the company from 1945 to 1948, when he was appointed assistant to the president of the National Bearing Division. He will continue to be located at division headquarters in St. Louis.

♦ ♦ ♦

Charles W. Bucklar, recently elected chairman of the Central Illinois Chapter of the American Foundrymen's Society, is manager, Superior Foundry Co., East Peoria, Ill., producers of brass and aluminum castings. Mr. Bucklar, following graduation from Bradley University in 1935, worked for 3 years in the foundry division, Caterpillar Tractor Co., Peoria, Ill. He then became associated with his father, Charles Bucklar, owner of Superior Foundry Co. He served as vice chairman of the Central Illinois Chapter last year.

♦ ♦ ♦

Sands G. Falk has been appointed manager of foundry sales, Falk Corp., Milwaukee, succeeding **John S. Wilkinson,** who will become foundry sales consultant upon his return from Europe in October. Mr. Falk, a graduate of University of California, has been associated with the company 10 years, and has been assistant manager the past 5 years. Mr. Wilkinson joined the company in 1905 and has been active in foundry sales for more than 20 years. He plans to retire at the end of the year following three months as foundry sales consultant.

♦ ♦ ♦

Hobart C. Ramsay, since 1945 executive vice president, Worthington Pump & Machinery Corp., Harrison, N. J., has been elected president, succeeding **Clarence E. Searle,** who has become vice chairman of the board of directors. Mr. Ramsay, associated with the company since 1920, engaged in sales and manufacturing operations, including 7 years in Europe with the company's foreign operations. **Edwin J. Schwanhausser,** for the past 4 years vice president in charge of sales, succeeds Mr. Ramsay as executive vice president. He has been associated with the company since 1915. **John J. Summersby,** assistant vice president and general sales manager since 1937, becomes vice president in charge of sales. **Thomas J. Kehane** succeeds Mr. Summersby as assistant vice president and general sales manager.

♦ ♦ ♦

James T. Leisk, for the past 8 years chief metallurgist, Chicago Hardware Foundry Co., North Chicago, Ill., has been appointed general manager, Swanson Foundry Co., Moline, Ill. A graduate of Michigan College of Mining and Technology, Mr. Leisk spent 3½ years in the metallurgical department of the Wisconsin Steel Works of International Harvester Co., in Milwaukee, and 3 years as metallurgist with Western Foundry Co., Chicago, prior to joining Chicago Hardware Foundry Co. in 1941.

♦ ♦ ♦

C. E. Weir, formerly assistant manager, Geneva, N. Y., plant, United States Radiator Corp., has been appointed manager of the Edwardsville, Ill., plant, succeeding **G. F. Naumann** who retired recently because of ill health. Mr. Weir entered the West Newton, Pa., plant of the company in 1916, following graduation from State University.

♦ ♦ ♦

Charles M. Phillips, vice president and treasurer, Phillips Foundry Co., Bakersfield, Calif., recently celebrated his 50th year in the foundry industry at a dinner given at his home there for company officers and employees.

(*Continued on page* 104)

WILLIAM G. MIXER

ROGER W. BATCHELDER

CHARLES W. BUCKLAR

SANDS G. FALK

DO IT THE NEW WAY. . . . . THE Bayflex® WAY!

- Clean and smooth rough surfaces
- Bevel, preparatory to welding
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- Remove fins and gates
- Streamline welds

Do ALL of these operations with a single tool . . . the Bayflex Raised Hub Disc-Wheel.*

Write today for a demonstration. You will save money.

*Will fit all standard right angle head grinders and sanders, air or electric.

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Smoothing surface of wire drawing block.

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Distributors, All Principal Cities

Top Performance Consistently Duplicated

Men OF INDUSTRY

(*Continued from page* 102)

Mr. Phillips, a native of Pennsylvania, started his foundry career at the age of 17 and became well known as an executive in eastern foundries. He was one of the original stockholders and founders of the Phillips Foundry when it was organized in 1946.

♦ ♦ ♦

William G. Gude, recently elected president of the Northeastern Ohio Chapter of the AFS for the year 1949-50, is managing editor of THE FOUNDRY. Mr. Gude was graduated from Purdue University in 1925 with a degree in mechanical engineering. Following a period as a sales engineer with Reliance Electric & Engineering Co., Cleveland and New York, he joined the Penton Publishing Co. in 1926, and has been located in the Pittsburgh, Chicago, New York and Cleveland offices of that company. He served as associate editor of THE FOUNDRY from 1943 until 1946, when he was appointed managing editor. Mr. Gude is a former secretary of the Chicago Chapter of the AFS and was vice president of the Northeastern Ohio Chapter last year.

♦ ♦ ♦

Floyd O. Lemmon, recently elected president of Electric Metal Makers Guild, is melting superintendent, Ohio Steel Foundry Co., Springfield, O. Mr. Lemmon joined the company in 1935, and has served as foreman of the steel melting department and assistant plant superintendent. He has been melting superintendent in charge of stainless and steel melting departments since 1941. An active member of the Central Ohio Chapter of the American Foundrymen's Society, he is one of its former directors. Mr. Lemmon has presented papers on melting at meetings of the AFS and the American Institute of Mining and Metallurgical engineers.

♦ ♦ ♦

Walter Burk recently was appointed supervisor of foundry operation and purchasing agent, Woodmanse Mfg. Co., Freeport, Ill. Mr. Burk was associated with the Hamilton Foundry & Machine Co., Hamilton, O., for 5 years as molding supervisor, and for 3 years with Progressive Foundry Co., Perry, Iowa, as supervisor and consultant.

♦ ♦ ♦

Charles H. Cousineau has been appointed sales and service engineer, Carpenter Bros. Inc., Milwaukee, supplier of foundry sands, bonding clays, refractories, etc. Mr. Cousineau, a graduate of University of Michigan, until recently was field service engineer, Hill & Griffith Co., Cincinnati. Other connections include foundry metallurgist, West Michigan Steel Foundry Co., Muskegon, Mich., and sand research engineer, Lakey Foundry & Machine Co., also of Muskegon. Mr. Cousineau was chairman of the Western Michigan Chapter of the American Foundrymen's Society in 1947-48.

♦ ♦ ♦

Ralph M. Johnson, vice president in charge of sales, Norton Co., Worcester, Mass., has been elected second vice president of the American Supply and Machinery Manufacturers' Association Inc. **C. Leonard Shaw,** publicity manager for Norton Co., has been re-appointed to the publicity committee of the association.

♦ ♦ ♦

Lee S. Whitson has been appointed professor of mechanical engineering, University of Minnesota, in charge of the industrial engineering section in the institute of technology, effective Sept. 16. Mr. Whitson has been associated with Minnesota Mining & Mfg. Co., St. Paul, since 1935, the last three years as head of the industrial engineering department. Earlier this year the Gilbreth medal was presented to Mr. Whitson by the Society for the Advancement of Management at the university for outstanding achievement in the field of motion, skill and fatigue studies.

♦ ♦ ♦

Ora F. Metz has retired as district manager of the El Paso, Tex., and Phoenix, Ariz., offices Allis-Chalmers, Milwaukee, following 43 years of service with the company. Mr. Metz became a sales representative in the El Paso office in 1913, branch manager there in 1935, and was named district manager in 1939. With his retirement, El Paso becomes a branch office under Phoenix, with **John E. Despins** as manager. Mr. Despins joined the company in 1936 and has been a sales representative in the El Paso office since 1940. **W. C. Kinnon,** who was manager of the Phoenix branch office, continues as manager of the new district office.

♦ ♦ ♦

Herman Van Fleet, Air Reduction Co., New York, has been awarded the James Turner Morehead Medal for 1948, awarded annually by the International Acetylene Association. The medal was presented to Mr. Van Fleet at the recent convention of the association in Pittsburgh in recognition of his leadership and direction in the production of acetylene and oxygen, and in the development of equipment for their use.

♦ ♦ ♦

Herbert F. Miller, who served during the war as foundry superintendent at the defense plant of the Continental Foundry & Machine Co., is resuming practice as consultant in foundry operation and engineering with offices at Rock-

(*Continued on page* 107)

WILLIAM G. GUDE

FLOYD O. LEMMON

WALTER BURK

CHARLES H. COUSINEAU

BETTER CORES = BETTER CASTINGS

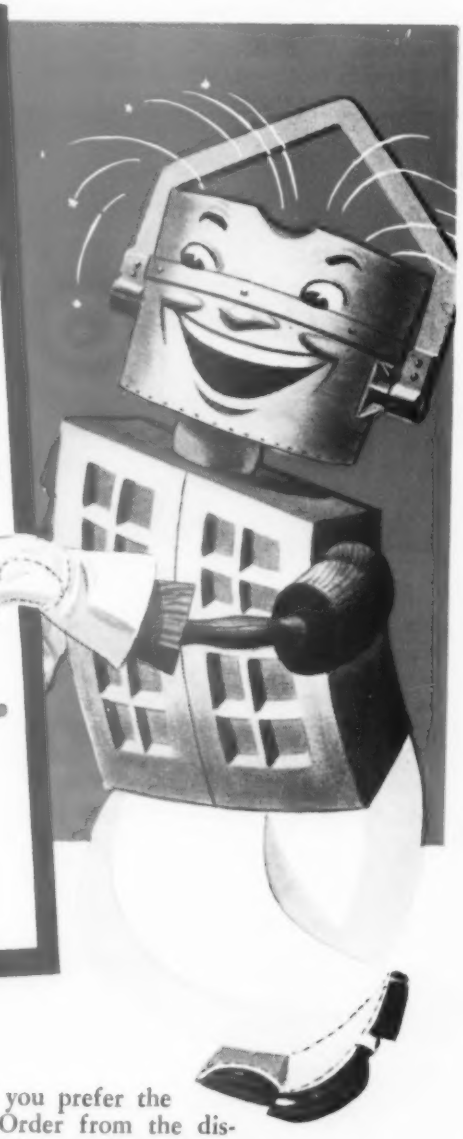
...Here are 4 Ways to Improve your Core Making—Use Krause Cereal Binders

1 GET MORE GREEN STRENGTH

2 IMPROVE FLOWABILITY AND TEXTURE

3 PRODUCE FINER DETAIL

4 GET EASY BURN-OUT, COLLAPSIBILITY



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Get the binder advantages you need and want —specify TRUSCOR if you like light weight; AMERIKOR if you prefer the heavy weight. Order from the distributors listed below or direct from us.

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World's largest dry corn millers.

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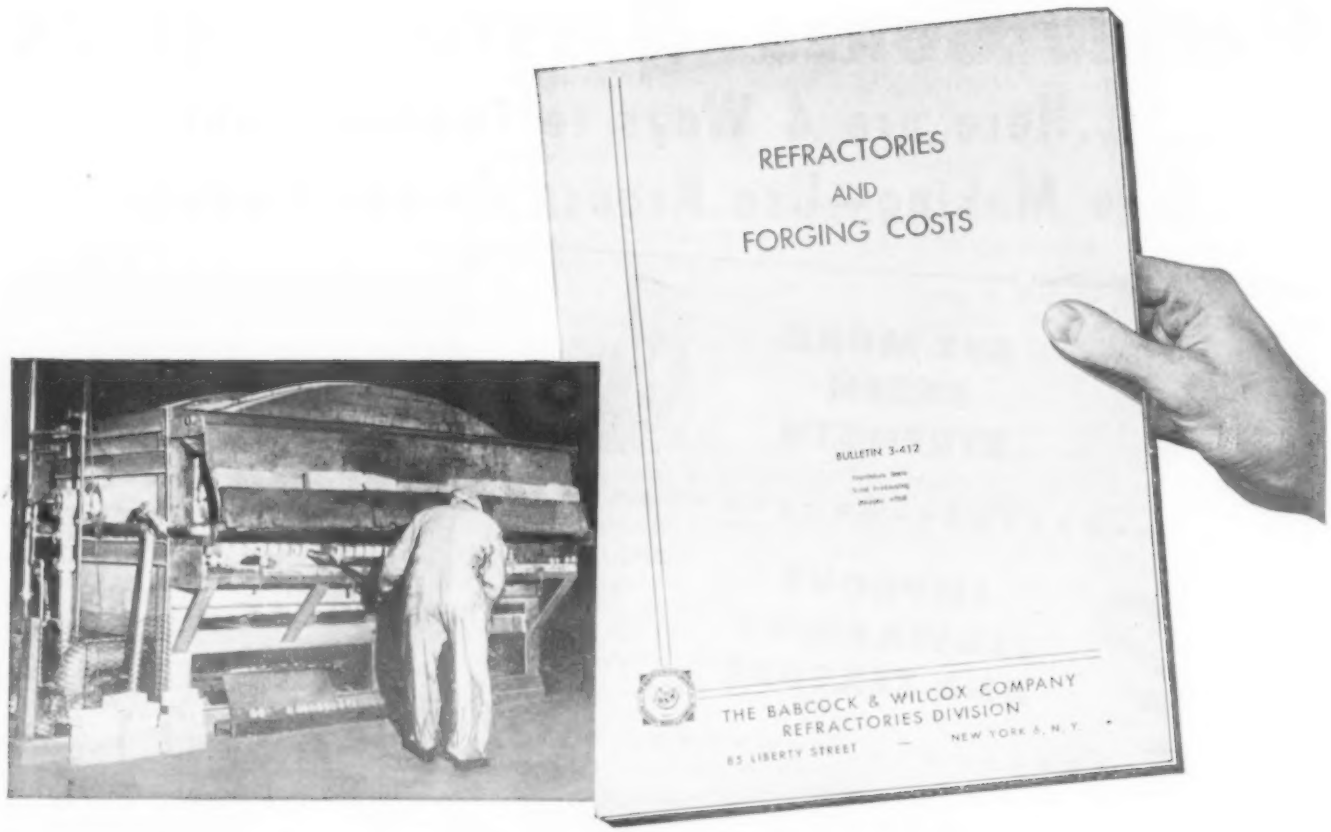
J. H. Hatten & Son, Aldan,
Delaware Co., Pa.
J. B. Hayes Co.
Birmingham, Ala.
Independent Foundry Supply
Co., Los Angeles 11, Calif.

Marthens & Co., Moline, Ill.
Carl F. Miller & Co.
Seattle 4, Wash.
Milwaukee Chaplet & Mfg.
Co., Milwaukee 4, Wis.
Pacific Graphite Works
Oakland 8, Calif.

Porter-Warner
Chattanooga 2, Tenn.
Smith-Sharpe Co.
Minneapolis 14, Minn.
Frederic B. Stevens, Inc.
Buffalo 12, N. Y.
Frederic B. Stevens, Inc.
Cleveland 14, Ohio

Frederic B. Stevens, Inc.
Detroit 26, Mich.
Frederic B. Stevens, Inc.
New Haven 11, Conn.
Western Industrial Supply Co.
Portland 14, Ore.



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- **Fuel consumption — down 30% to 75%**
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REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
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(*Continued from page* 104)

ford, Ill. Mr. Miller's 30 years of experience include service in the gray iron, malleable iron and steel foundry fields. He also has been associated with the American Steel Foundries, General Steel Castings Corp., Central Specialty Division, King-Seeley Corp., and Gunite Foundries Corp.

♦ ♦ ♦

R. G. Caulley, recently appointed general sales manager, Peninsular Grinding Wheel Co., Detroit, has been named vice president in charge of sales. Formerly assistant sales manager for Republic Steel Corp., Cleveland, and director of purchases, Fruehauf Trailer Co., Detroit, Mr. Caulley operated his own wholesale steel warehouse in Florida before joining the company. **Dr. W. R. Morgan,** formerly research professor of ceramic engineering at University of Illinois, has been appointed director of production and engineering of the new vitrified division plant of Peninsular. He was formerly director of research at Bay State Abrasive Products Co., Westboro, Mass., and also served as associate professor of ceramic engineering at Rutgers University.

♦ ♦ ♦

C. W. Dean, Industrial Sales & Engineering Co., Memphis, Tenn., has been appointed dust control representative for American Air Filter Co., Louisville, in the Memphis territory. Mr. Dean, a graduate of University of Tennessee, spent 6 years at the Memphis plant of Buckeye Cotton Oil Co., Cincinnati, in research and development work related to purification of cotton linters for smokeless powder, rayon and plastic manufacturers. In 1947 he became production manager and chief engineer, Buckman Laboratories Inc., Memphis, later organizing Industrial Sales & Engineering Co.

Edward D. Boyle, who has been elected president of the Washington Chapter of the American Foundrymen's Society for the year 1949-50, is master molder, Puget Sound Naval Shipyard, Bremerton, Wash. Mr. Boyle has spent his entire career at the Naval Shipyard, entering the pattern shop loft there in 1916. During the First World War he had charge of the pattern loft for two years and in 1918 was transferred to the foundry where he became a molder in 1920, supervisor in 1929 and master molder in 1943. He has supplemented his work there with four years of study in metallurgy at night school. When the Washington Chapter was organized Mr. Boyle was one of its first directors.

♦ ♦ ♦

Arthur H. Bunker, formerly a general partner of Lehman Brothers, Hoboken, N. J., has been elected president, Climax Molybdenum Co., New York. Mr. Bunker, who before the war was executive vice president of the banking house of Lehman Bros. Corp., New York, was the founder and first president of U. S. Vanadium Corp., which later became a unit of Union Carbide & Carbon Co., New York. During the war he was director of the Aluminum Magnesium Division, War Production Board, later deputy executive vice chairman of WPB and finally its chief of staff. At present he is a director of the American Metal Co. Ltd., New York, Firth Sterling Steel & Carbide Corp., McKeesport, Pa., and Climax Molybdenum Co.

♦ ♦ ♦

Charles Pingry has been appointed district sales engineer in the Dallas, Tex., office of Chain Belt Co., Milwaukee. Mr. Pingry was graduated from Purdue University. **Charles Moeller** has been named district sales engineer in the Kansas City, Mo., office. Also a graduate of Purdue University, Mr. Moeller took post graduate work at University of Michigan. Following military service Messrs. Pingry and Moeller enrolled in the student engineering training program of Chain Belt Co. and have had considerable practical experience in its shops and offices in Milwaukee, Springfield and Worcester, Mass.

♦ ♦ ♦

F. E. Schuchman has been elected president, Homestead Valve Mfg. Co., Coraopolis, Pa. Mr. Schuchman began as a core maker in the foundry of the company which his father founded in 1892, and has worked in every department of the organization. He is also general manager and treasurer of the company. **W. R. Schuchman,** another son of the founder, has been named chairman of the board of directors, following 28 years as president. **J. E. Roth** becomes chairman of the advisory committee, **Bradley McCormick,** secretary, and **N. E. Kolesar,** assistant treasurer.

♦ ♦ ♦

Prof. R. F. Mehl, director of the metals research laboratory and head of the department of metallurgical engineering, Carnegie Institute of Technology, Pittsburgh, and **Dr. R. A. Wilkins,** vice president in charge of research and development, Revere Copper & Brass Inc., Rome, N. Y., have been appointed honorary corresponding members to the council of the British Institute of Metals, for the United States.

♦ ♦ ♦

Lawrence E. Dickson, president, Standard Safety Equipment Co., Chicago, has been re-elected president, Industrial Safety Equipment Associa-

(*Continued on page* 110)

R. G. CAULLEY

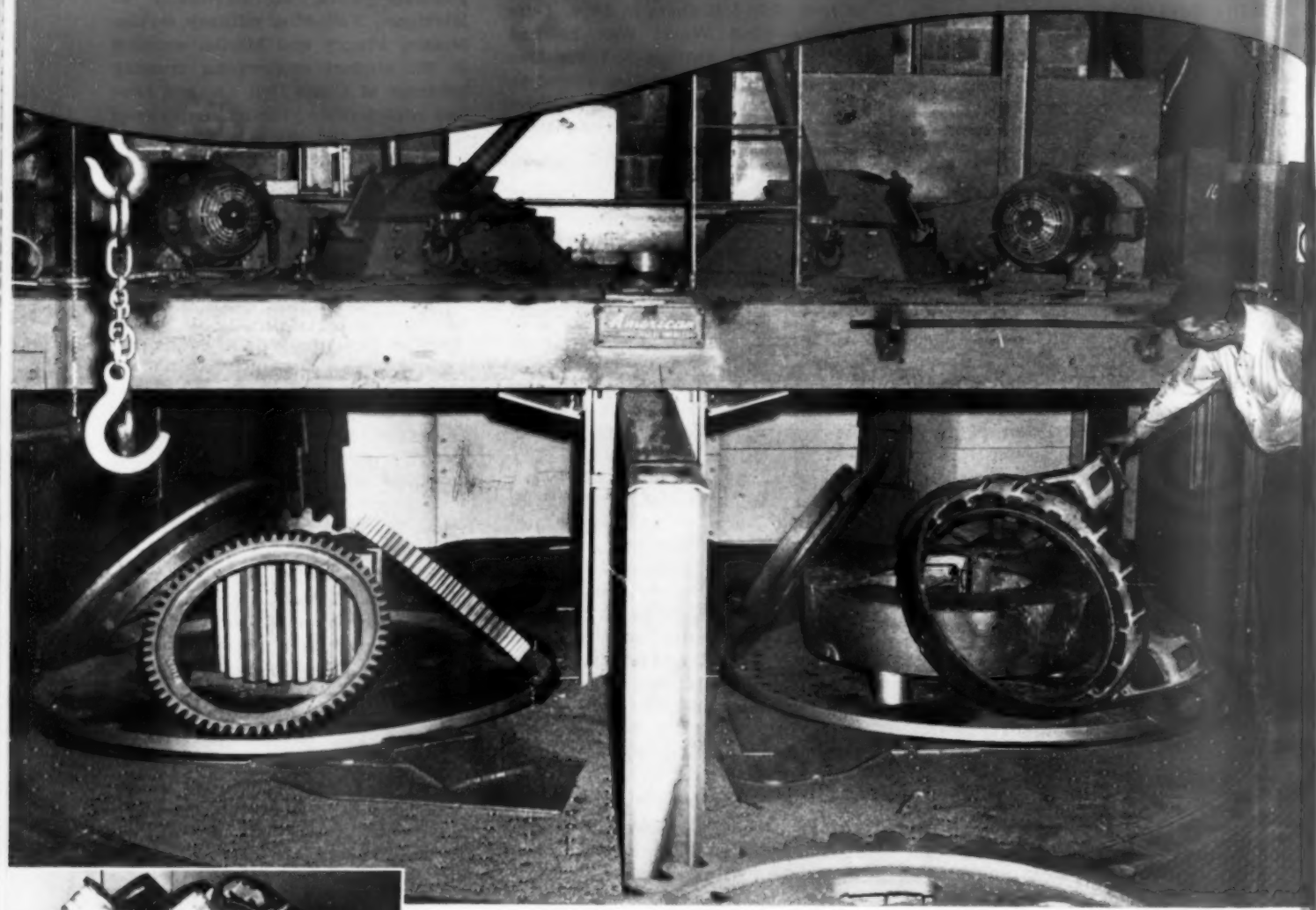
C. W. DEAN

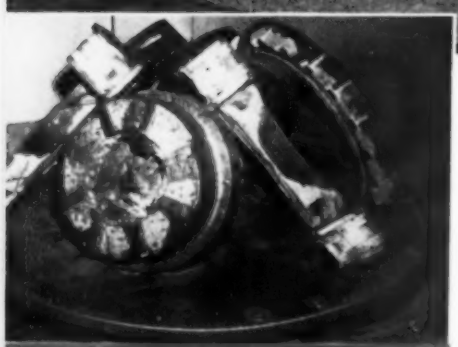
EDWARD D. BOYLE

ARTHUR H. BUNKER

WHEELABRATOR®

72″ TWIN TABLE





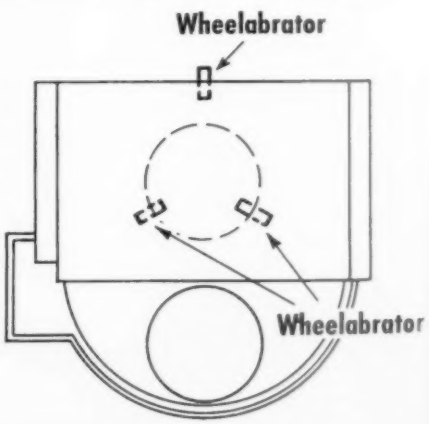
BEFORE WHEELABRATING

AFTER WHEELABRATING

The Answer to Slow, High Cost, Unhygienic Airblast Room Cleaning

The slow, laborious, unhygienic hand blasting of large castings is no longer necessary. The Wheelabrator Twin Table handles these pieces at much higher production speeds and at greatly reduced cost.

The Twin Table has a rotating platform, divided into two halves by a steel partition which also acts as a door. Each half of the platform is equipped with a work table (60″, 72″ or 86″ dia.) which rotates while in the blast from three Wheelabrator units that are so positioned that all exposed surfaces are thoroughly cleaned. While one work table is inside the cabinet for the cleaning operation, the other is outside for loading or unloading.



SAVES $10,275 A YEAR

for the SAWBROOK STEEL CASTINGS CO.

LOCKLAND, OHIO

The Wheelabrator 72″ Twin Table, installed at Sawbrook Steel Castings Co., is effecting a direct, traceable saving of $41.10 every working day.

Steel castings weighing from 50 lbs. to 3500 lbs. each are being handled in this equipment. The machine replaced a humane-type airblast table and a large airblast room with monorail conveyor, both of which involved high cleaning costs, long cleaning periods and constant maintenance expense. Comparative cleaning costs are summarized in the chart below.

The Twin Table is the second Wheelabrator to be installed by Sawbrook within a year. The first machine . . . . a 48″ x 72″ Wheelabrator Tumblast (30 cu. ft. capacity) . . . . did such a remarkable job of reducing costs and speeding up production that Sawbrook officials came to *American* when they were interested in replacing their airblast room equipment. The two Wheelabrators have the capacity of handling twice the production now going through this department.

The experience at Sawbrook in reducing cleaning costs and alleviating other cleaning problems is typical of hundreds of other plants using Wheelabrator equipment. We would be glad to have the opportunity to show you by convincing tests and concrete facts how the Wheelabrator can do the same for you . . . . there is no obligation, of course.

COST COMPARISON

at the Sawbrook Steel Castings Co.

This is a jobbing foundry, producing steel castings weighing from 1 pound to over a ton. Castings are cleaned three times—(1) in the green with gates and risers attached, (2) after annealing, and (3) finish cleaning after grinding, welding, etc.

FORMER METHOD	WHEELABRATOR METHOD	SAVINGS
MACHINES Airblast Room Humane Airblast Table	**MACHINE** 72″ Wheelabrator Twin Table with three Wheelabrator Units.	
PRODUCTION 30 tons daily	**PRODUCTION** 30 tons daily	**PER TON** $1.37
LABOR REQUIREMENTS 6 men, 50 man hours daily	**LABOR REQUIREMENTS** 3 men, 24 man hours daily	**PER DAY** $41.10 (30 tons)
COST PER TON $4.75	**COST PER TON** $3.38	**PER YEAR** $10,275 (250 days)

New, informative book gives complete, concise information on all phases of airless blast cleaning. Write today for Catalog No. 74-A.

THE AMERICAN MOLDER

American

WHEELABRATOR & EQUIPMENT CORP.

505 S. Byrkit Street — Mishawaka 2, Indiana

Men OF INDUSTRY

(*Continued from page* 107)

tion, New York. **Charles H. Gallaway,** sales manager, Safety Products Division, American Optical Co., Southbridge, Mass., has been named vice president of the association and **William J. Parker,** William J. Parker Inc., New York, secretary-treasurer.

♦ ♦ ♦

Curtis C. Gary, for the past 2 years assistant to the vice president in charge of sales, Brake Shoe & Castings Division, American Brake Shoe Co., New York, has been appointed assistant to the president of the division. Mr. Gary, a graduate of Yale University, joined the company in 1942 and shortly thereafter entered sales work. **John F. Ducey Jr.** and **Sam R. Watkins** have been appointed district sales managers of the division. Mr. Ducey joined the division following graduation from Harvard University in 1936, and is located in the New York office of the company. Mr. Watkins has been with the division since he was graduated from Yale University in 1939, and is located in the Cleveland sales office.

♦ ♦ ♦

T. M. Robie has been appointed director of quality control, Beloit, Wis., plant of Fairbanks, Morse & Co. **J. W. Wright** succeeds Mr. Robie as manager of the company's Diesel Division, with headquarters in Chicago. Mr. Robie, a graduate of University of Michigan, joined Fairbanks, Morse & Co. in 1919 and has served in manufacturing, service and sales work in Beloit, Wis., Dallas, Tex., New York and Chicago. Mr. Wright, a graduate of University of Kansas, has served in the Beloit, Wis., plant, Cleveland, Buffalo, Kansas City, Mo., offices, and Dallas, Tex., branch. He has been manager of the company's Diesel Engine Department, Kansas City branch, since 1946.

♦ ♦ ♦

James D. Cunningham, president, Republic Flow Meters Co., Chicago, has been nominated president of the American Society of Mechanical Engineers, New York, for the year 1950, to succeed **James M. Todd,** consulting engineer, New Orleans. Mr. Cunningham, born and educated in Chicago, served as vice president of Clyde Machine Works Co. from 1909 until 1911, when he founded and became president of Steam Appliance Co., now Republic Flow Meters Co., manufacturers of industrial instruments and controls.

♦ ♦ ♦

C. E. Bonnet has been appointed production manager of the Industrial Chemical Division, American Cyanamid Co., New York. Mr. Bonnet, who has been associated with the company for more than 15 years, is succeeded as assistant general sales manager of the division by **G. W. Russell,** formerly manager of the new products development department.

♦ ♦ ♦

William Van C. Brandt has been appointed managing director of the Electric Industrial Truck Association, Long Island City, N. Y., succeeding **C. F. Kells,** who has entered the publishing business. Mr. Brandt has resigned as manager of railway and motive power sales for the Electric Storage Battery Co., Philadelphia, to accept the new position.

♦ ♦ ♦

Robert A. Specht has been appointed manager of a new Heat Transfer Division which the National Radiator Co., Johnstown, Pa., has established at 60 East 42nd St., New York. Mr. Specht has been associated with the company for several years as an Eastern sales representative in its Industrial Division.

Henry A. Blessing, formerly Chicago field engineer, Norton Co., Worcester, Mass., has been appointed abrasive engineer responsible for a new territory, with headquarters in Des Moines, Iowa. **Myles A. Snyder,** of the Worcester sales engineering department, has been named Chicago field engineer, and **David H. Paul,** also of the Worcester sales engineering department, has been appointed abrasive engineer in charge of a new territory with headquarters in Memphis, Tenn.

♦ ♦ ♦

Frank M. Goodman has been appointed sales promotion manager of the industrial division, Lincoln Engineering Co., St. Louis, in charge of sales of the company's industrial lubricating equipment. Mr. Goodman has been associated for 16 years with Skilsaw Inc., Chicago, in sales and management work in Pittsburgh, Cleveland and the east.

♦ ♦ ♦

W. G. Twyman, formerly production manager, A. P. Green Fire Brick Co., Mexico, Mo., has been transferred to Detroit as general manager of the A. P. Green Fire Brick Co. of Michigan, a subsidiary selling company covering that state. **W. F. Mundy,** until recently plant superintendent, succeeds Mr. Twyman as production manager.

♦ ♦ ♦

H. L. Smalley, until recently assistant to the vice president, Harbison-Walker Refractories Co., Pittsburgh, has been appointed assistant to the president. Mr. Smalley, who joined the company in 1922, and later became Chicago district sales manager, will continue to have his headquarters in Pittsburgh.

♦ ♦ ♦

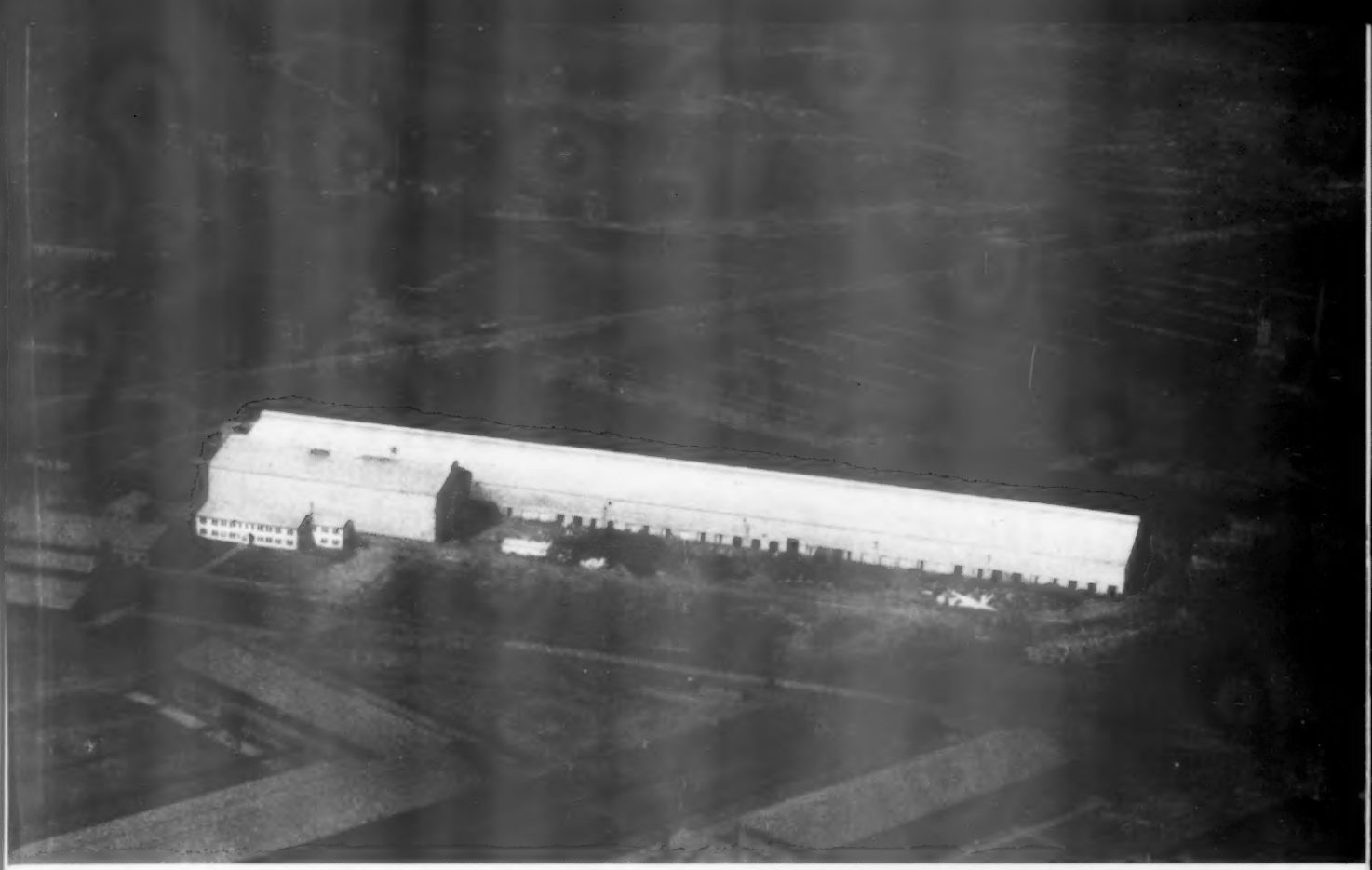
Clyde Williams, director of Battelle Memorial Institute, Columbus, O., was awarded the honorary degree of Doctor of Engineering, at recent com-

(*Concluded on page* 113)

SAM R. WATKINS

CURTIS C. GARY

JOHN F. DUCEY JR.



Location of the Aluminum Alloy Division, Vanadium Corporation of America, near Chester, Pa. Leased from War Assets Administration.

NEW SOURCE OF ALUMINUM-RICH ALLOYS

FOR THE ALUMINUM AND STEEL INDUSTRIES

Our Aluminum Alloy Division, with headquarters at Chester, Pa., has begun commercial production of aluminum-rich alloys to serve the aluminum industry and to supplement the deoxidizers we have supplied for many years to the steel industry. The grades and compositions offered are:

FOR STEEL

Grade 1 . . . . . 95 to 97% Aluminum
Grade 2 . . . . . 92 to 95% Aluminum
Grade 3 . . . . . 90 to 92% Aluminum
Grade 4 . . . . . 85 to 90% Aluminum

Ingots, notch bars, shapes (stars, rings, etc.), shot and grain—for deoxidation and grain size control.

FOR ALUMINUM

Vanadium-Aluminum . . . . . 2½, 5 and 10% V
Titanium-Aluminum . . . . . 2½ and 5% Ti
Silicon-Aluminum . . . . . 5 to 20% Si

For alloying, for grain refinement, and for improving the mechanical properties and fabricating qualities of numerous aluminum alloys.

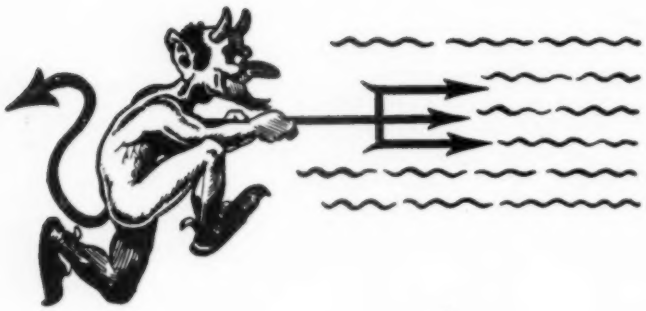
Careful supervision of manufacture in the largest electric furnace ever built for the melting of aluminum, combined with close spectrographic control, assures quantity production of quality material.

Write us for details as to how these products can serve you

MAKERS OF ALLOYS — VANCORAM — CHEMICALS AND METALS

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH



Soffel's

THERMOTOMIC PROCESS

(Patented)

and

CARBON FREE LIQUIDIZER

For

STEEL • IRON • ALUMINUM BRASS • BRONZE • COPPER

Keeps metal molten!

300 lb. aluminum bronze bearing cap cast with THERMOTOMIC feeding ring core under riser. Note small feeder opening which facilitates removal of riser from casting, resulting in greatly reduced cleaning costs.

THERMOTOMIC is a patented Exothermic compound that can be molded into any desired shapes and used as feeding inserts under risers or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with very small feeder openings. This permits easy removal of heads and gates and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing in the mold, heat at thin metal sections is retained until the main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength.

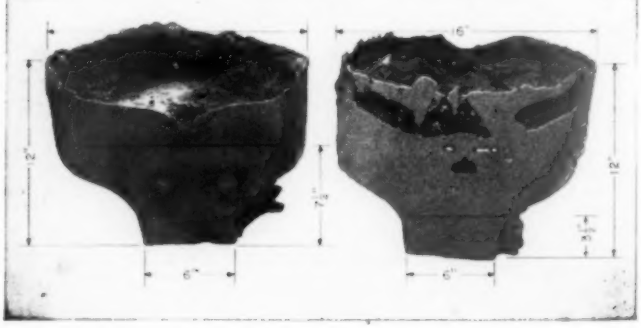
Thermotomic ABC for Aluminum and Magnesium Castings

THERMOTOMIC ABC is the first successful exothermic feeding compound ever to be developed for aluminum and magnesium castings. Results obtained from its use are amazing. Feeding metal in heads or risers is maintained in the fluid state for 20 to 30 minutes. Great savings are effected through reduced riser dimensions. Feeding heads or risers are reduced in volume 80% and more, and their removal from the casting is greatly facilitated due to the restricted feeding necks.

An Exothermic Feeding Head Compound and Pipe Eliminator For Aluminum and Magnesium Castings

SOFFEL'S AL-X31 LIQUIDIZER was developed for use in conjunction with THERMOTOMIC ABC. In order to secure best results and maximum feeding, we strongly recommend that AL-X31 LIQUIDIZER be applied on the feeding heads or risers. When so applied, AL-X31 LIQUIDIZER enters into an intense exothermic action which will actually raise the temperature of the feeding metal. The heat produced is sufficiently great that, even if the metal has solidified, it will re-melt. After AL-X31 LIQUIDIZER has completed its exothermic action, it forms a soft, insulating cover on the feeding metal. This cover confines the heat generated and further delays solidification of the feeding heads or risers.

SOFFEL'S CARBON FREE LIQUIDIZER PRODUCES GREATER YIELD



Steel Riser on left contains twice as much sound metal

These risers, made in the same mold, illustrate how Soffel's Carbon-Free Liquidizer produces sounder castings and saves metal. The riser on the left, on which Carbon-Free Liquidizer was used, contains more than twice as much sound metal as the riser on the right on which a common carbonaceous pipe eliminator was used. It is readily seen from this that the use of Soffel's Carbon-Free Liquidizer permits substantial reductions in size of risers.

BEWARE OF IMITATIONS: We are the originators of Carbon Free Liquidizer.

PITTSBURGH METALS PURIFYING COMPANY

Manufacturers of Quality "Fluxes for all Metals and Alloys"

1352 Marvista Street **Pittsburgh 12, Pa.**

Men OF INDUSTRY

(*Concluded from page* 110)

mencement ceremonies of the Michigan College of Mining and Technology, Houghton, Mich., in recognition of significant contributions in the fields of science and public service.

♦ ♦ ♦

J. P. Dickinson has been named vice president and general manager, Stow Mfg. Co., Binghamton, N. Y. Mr. Dickinson, who has been vice president in charge of sales since 1943, has been associated with the company for 30 years. **J. L. Dickinson,** for the past 6 years vice president in charge of production, has been appointed vice president in charge of sales. He has been with the company for 14 years. **W. W. Rappman,** associated with the company for 10 years, has been named sales manager. Mr. Rappman has been assistant sales manager since 1945.

♦ ♦ ♦

George J. Albright Jr. has been appointed district sales representative in Memphis, Tenn., for the Baker Industrial Truck Division, the Baker-Raulang Co., Cleveland. Mr. Albright was graduated from North Carolina State College and has specialized in material handling applications.

♦ ♦ ♦

Allan Wigle has joined L. A. Cohn & Bro. Inc., Chicago, as general plant manager, succeeding **Charles Dosenbach,** who has resigned. Mr. Wigle has been engaged in supervision of nonferrous metal and alloy production since 1926, when he was graduated from University of Toronto.

♦ ♦ ♦

David Edelstein has been appointed scrap purchasing agent for the eastern territory, Federated Metals Division, American Smelting & Refining Co., with headquarters at the company's home office in New York. A graduate of New York's City College, Mr. Edelstein joined Federated in 1928 while studying at Columbia University as a graduate student. He was appointed assistant superintendent of the Perth Amboy, N. J., plant, in charge of aluminum operations, and later placed in charge of scrap materials there.

♦ ♦ ♦

Joseph N. Moorhead was honored at a testimonial dinner July 16, at Hotel Touraine, Buffalo, by employees and executives, upon his retirement as manager of the Buffalo Works, American Magnesium Corp., Cleveland, subsidiary of Aluminum Co. of America. Mr. Moorhead joined the Aluminum Co. in 1917, became manager of the Buffalo plant in 1926, and following its closing in 1932 was transferred to the Cleveland foundry. He returned to Buffalo as works manager in 1944.

♦ ♦ ♦

William H. Gamble, vice president, Corn Products Refining Co., New York, has been named a director of the company, succeeding **Frank H. Hall,** who has resigned following 34 years as a director. Mr. Gamble, who is president of Corn Products Sales Co., New York, has been associated with the company since 1910.

♦ ♦ ♦

E. C. McFaul has been named manager of a new district office recently established by Wheelco Instruments Co., Chicago, at 307 East Fourth St., Cincinnati. The district comprises Kentucky, southwestern Ohio and northeastern Indiana.

♦ ♦ ♦

John G. Rush, until recently foundry superintendent, the Elkhart Brass Mfg. Co., Elkhart, Ind., has resigned. His duties have been assumed temporarily by **O. R. Hanchett,** efficiency engineer for the company.

♦ ♦ ♦

P. W. Grace has been named assistant to the president, the Capewell Mfg. Co., Hartford, Conn., manufacturers of band and hack saw blades, hammers, foundry chill nails etc. **John W. Clark** has been appointed director of sales and executive assistant to the president.

♦ ♦ ♦

V. E. Lawford has been appointed sales representative in the Northern California territory of Buckeye Tools Corp., Dayton, O., manufacturer of air and high frequency electric portable tools. He has opened an office at 656 31st St., Oakland 9, Calif.

♦ ♦ ♦

W. R. Patterson has been appointed general superintendent of the steel department, at the Torrance, Calif., plant, the National Supply Co., Pittsburgh. Mr. Patterson will also continue as chief plant metallurgist there, a position which he has held since 1943.

♦ ♦ ♦

Dr. Fritz V. Lenel and **Dr. Arthur A. Burr** have been made associate professors in the department of metallurgical engineering, Rensselaer Polytechnic Institute, Troy, N. Y. **Ralph R. Nash** has been appointed an assistant professor in the department.

♦ ♦ ♦

J. A. Durr has resigned as technical adviser to the general manager, Albion Malleable Iron Co., Albion, Mich., to enter the consulting field, specializing in scrap and man hour reduction. Mr. Durr's address is Box B, Albion, Mich.

♦ ♦ ♦

George M. Baumann has been appointed purchasing agent and assistant to the plant manager of the Whiting, Ind., plant, Federated Metals Division, American Smelting & Refining Co., New York.

J. P. DICKINSON

J. L. DICKINSON

W. W. RAPPMAN

NEW OSBORN MOULDING MACHINES

80% AT WESTINGHOUSE

1

● The recently mechanized foundry of Westinghouse Electric Corporation at East Springfield, Mass. has increased operating efficiency more than 80% and substantially reduced physical fatigue, state company officials.

And new Osborn Automatic Moulding Machines are a contributing factor in reducing the cost of small castings through more efficient production.

Shown here, in photos 1, 2 and 3, is the sequenced operation of one of several #716 PV Osborn Automatic Vibrating Jolt-Squeeze-Stripper Moulding Machines.

Both cope and drag are moulded simultaneously. The machine jolts, squeezes, vibrates and strips patterns automatically.

2

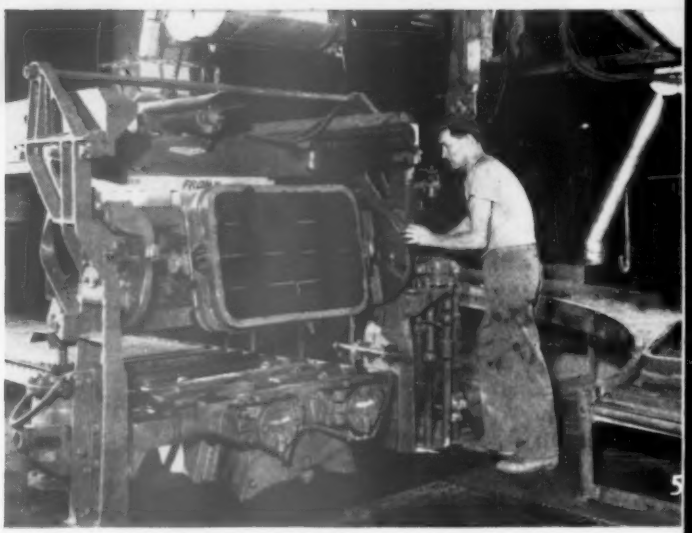
3

THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue Cleveland, Ohio

HELP TO INCREASE EFFICIENCY
ELECTRIC CORP. FOUNDRY

4


5

6

7

● Photos 4, 5 and 6, shown above, feature one of several large Osborn Jolt-Squeeze-Rollover Machines in use at the Westinghouse foundry. After drag is filled with sand from overhead hopper with air-operated gate, the machine, equipped with air clamps and power rollover, jolts, squeezes, rolls over, vibrates and draws the drag mould. Finished moulds are removed by means of a built-in conveyor. Typical examples of gray iron castings required for fan bases, housings for motors, compressor parts, etc., moulded with Osborn Automatic Moulding Machines are shown in photo 7.

If you want to cut production costs, why not let an Osborn factory-trained Sales Engineer analyze your requirements. There will be no obligation.

OSBORN®

MOULDING MACHINES CORE BLOWING MACHINES

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

AROUND Detroit

Automotive schedules maintain fast pace despite weather and brief work stoppages . . . Reversal of recent downward trend in releases for raw materials appears indicated

LONG weeks of oppressive heat and humidity, particularly emphatic this summer, have made scarcely a dent on automotive production schedules, which have been holding to approximately 28,000 cars and trucks daily and, from all indications, will remain steady at that figure at least through August. Occasional "heat stoppages" have occurred at Chrysler, Hudson, Briggs, Packard and a few others, but they all have involved relatively small groups who may have been more disturbed by some phase of union politics than by the weather. About the only foundry walkout that has been publicized was at the Dodge main plant, where a small day-shift group in the cleaning room left their jobs, claiming they could not stand the heat. They were back the next day.

There are a good many sections of any foundry where the temperature is higher than in the cleaning room so the actions of the above few come in for suspicion. Interruptions of this sort are quickly reflected in other departments and it is usually necessary to suspend the entire operation, even though possibly not more than half a dozen complainants are involved. Actually, in plants where hot metal is being handled, the working force is not affected by hot weather as much as in departments of a cooler climate.

Automotive foundries generally have been able to build up good backlogs ahead of machining departments, so an occasional defection from the heat does not cause as much trouble as it would have a couple of years ago when materials problems were putting the pressure on foundries to keep up with overall schedules. Today there is plenty of pig iron and scrap, plenty of coke, ample miscellaneous supplies, so while schedules are high they can be met more easily than before.

Vendors to the automotive foundries have been enjoying vastly better business than on other accounts which have been slow since the first of the year. However, even around Detroit there has been a tendency to hold down inventories and use up materials in stock; consequently releases have tapered the last three months. In mid-July there were some indications that a resumption of higher schedules on buying was being effected, suggesting that inventories had been worked down to normal or even well below normal. A turnout of 28,000 cars and trucks daily cannot be achieved without a high level of purchases for all materials needed.

* * *

TAKING cognizance of the activity in the field of high-compression engines, coming principally from General Motors, engineers of Hudson Motor Car Co. recently demonstrated an experimental car fitted with a stock model 6-cylinder engine of the L-head type, on which the aluminum head had been milled off about 1/32-inch to give a compression ratio of 9.3:1. Using 100-octane fuel, the engine showed particularly good acceleration characteristics above 30 mph, but Hudson officials could see no early production possibilities in view of the fact it may be some years before the necessary high-octane fuels are available generally. The interesting point was that Hudson did not consider it necessary to go to a V-type overhead valve engine to accommodate the higher compression, maintaining that ample strength had been designed into the six originally in 1946 so that all components—block, crankshaft, rods, pistons, etc.—provide a sufficient safety factor for operation at the high ratios. GM research engineers, on the other hand, have declared that above 8.4:1 the L-head design was not satisfactory because of low clearance between valves and cylinder head, poor scavenging of combustion chambers and other factors.

Hudson claims it was the first to introduce chrome-alloy iron cylinder blocks in the lower-price field. There is not much alloy in the iron, although it is somewhat harder than conventional cylinder iron. This complicates the machining problem to a degree but at the same time decreases the necessity for cylinder reboring after lengthy periods of service. Engineers also pointed to the heat-dissipating characteristics of the aluminum alloy cylinder head as being particularly valuable in high-compression operation.

* * *

REO Motors at Lansing has introduced a new heavy-duty gasoline engine built on the wet-sleeve principle with removable alloy iron liners. A three-year $1.5 million program of research and testing preceded production, along with a $3.5 million investment in advanced types of precision production machine tools. The engine has a square bore—4⅛ x 4⅛ inches—with 331 cubic inch displacement; integral manifold and cylinder head; sodium-cooled exhaust valves; seven-bearing crankshaft with induction-hardened journals and pins, and a viscous damper using silicone fluid to reduce vibration. Horsepower of 140 is developed at governed speed of 3200 rpm.

Cylinder sleeves come into direct contact with water in the block and are kept tight by an overlapping engine block gasket and two neoprene seals at the lower end. Pistons and sleeves are of standard size and thus can be stocked, purchased and installed as necessary, no selective fitting being required on overhaul.

The new engine will be used to power a new series of Reo trucks in the weight range of 17,000-22,000 pounds, and also a fleet of 5000 6x6 trucks of a new 2½-ton design which the company will furnish to Army Ordnance, shipments starting next March. The contract includes a large volume of parts and runs to about $31 million.

* * *

SUDDEN death on July 1 of 65-year-old Joseph L. Dostal, president of the Dostal Per-Mold Foundry Co., at Pontiac was a shock to his many friends in the foundry industry and elsewhere around Detroit where he had been active for nearly 40 years. Born in Wisconsin, he worked for a time with A. O. Smith Corp., then in 1910 transferred to the motor city to join Diamond Mfg. Co. and later the Holley Carburetor Co. Here, after a considerable period of experiment and development, working in co-operation with the late Dan Meloche, he perfected mechanical details of the Holley permanent mold casting machine, set up originally to cast Ford carburetors in gray iron. He held a

(*Concluded on page* 118)

"if it's mounted on Springs why don't it bounce?"

This fellow may sound a bit skeptical about Spring-Mounted Roller Conveyer, but that's not exactly so. Like other men who work with Foundry Conveyers, he knows that Roller Conveyer applied in this industry must have extra weight and strength built into it. He has seen a lot of too-light conveying equipment beaten to pieces in a short time under severe foundry service. That is why he is interested in Spring-Mounted construction. He is learning that when springs are pre-compressed to normal roller capacity, the load does not *bounce*, and the conveying surface is *smooth* and *even*. When the rollers are overloaded, the *springs* rather than the *bearings* of the rollers absorb the shock. Spring-Mounted Roller Conveyer is a Mathews development to meet the requirements of heavy industry for Roller Conveyer which will operate under severe conditions with a minimum of maintenance attention and expense, and it is establishing quite a reputation for itself by doing just that.

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
ELLWOOD CITY, PENNSYLVANIA

PACIFIC COAST DIVISION . . *Mathews Conveyer Company, West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

Engineering Offices or Sales Agencies in Principal American and Canadian Cities

(*Concluded from page* 116)

number of patents on the design.

In 1932 he joined the foundry division of Eaton Mfg. Co., originally the Erb-Joyce Foundry Co. and later the Eaton-Erb Foundry Co. He served there for 13 years, ultimately becoming vice president and general manager, watching the company's operations expand in a major way in the field of permanent mold gray iron castings for a wide variety of uses. In 1945 Mr. Dostal left Eaton to organize his own company in Pontiac, acquiring six 12-head casting machines which had been owned by Ford Motor Co. Two cupolas were erected and integrated with the casting units, annealing furnaces and grinding equipment.

He is survived by six children, with one boy Russell considered a likely successor to his father to operate the castings business. Another son is employed by Eaton at Vassar, Mich.

Plan ASM Program

Technical program for the 31st annual Metal Congress and Exposition, sponsored by the American Society for Metals, has been approved by the ASM Publications Committee. Nine sessions are scheduled for the congress, to be held in Cleveland's Public Auditorium Oct. 17-21. Included in the breakdown of the scientific papers to be presented are subjects of vital importance to production and treating of metals, as well as a morning period devoted to an Atomic Energy Metallurgy session. Subjects covered will include Alloy Steels, Oxidation, Quenching, High Temperature, Transformation in Steels, Temper Brittleness, Stainless Steels, Mechanical Metallurgy, Nonferrous Metals and Atomic Energy Metallurgy.

Films Show Use of Chaplets, Chills

Premier showing of two excellent films, one dealing with the use of chaplets and the other with the use of chills in foundry operations, was held by Fanner Mfg. Co., Cleveland, June 28 before a group of foundry representatives at Hotel Cleveland, Cleveland.

The black and white sound films have an interesting and well-presented commentary discussing the purposes and applications of chaplets and chills in the manufacture of castings, and describing operations pictured in the automotive, locomotive, radiator and boiler industries. Companies which served as locale for the various scenes were Ford Motor Co., Dearborn, Mich.; International Harvester Truck Engine Works, Division of International Harvester Co., Indianapolis; General Steel Casting Corp., Granite City, Ill.; U. S. Radiator Corp., Detroit; National Radiator Co., Trenton, N. J.; Burnham Corp., plants at Zanesville, O., and Elizabeth, N. J.; Caterpillar Tractor Co., Peoria, Ill.; Buckeye Steel Castings Co., Columbus, O.; Ohio Steel Foundry Co., Lima, O.; West Michigan Steel Foundry Co., Muskegon, Mich., and Cleveland Foundry Co., Cleveland.

Short sequences are devoted to a few phases of Fanner's manufacturing operations and its wire storage room with a commentary on accuracy standards required of materials used in the manufacture of chaplets and chills.

The film on chaplets runs about 30 minutes and the one on chills has a running time of approximately 15 minutes. The Fanner company plans to make available a number of copies of each film for distribution on a free loan basis among chapters of foundry technical societies, educational institutions and manufacturing concerns.

Meeting Calendar

Sept. 12-16—Fourth National Instrument Conference and Exhibit, sponsored by Instrument Society of America, Municipal Auditorium, St. Louis

Sept. 15-17 — Steel Founders' Society of America, annual technical and operating conference, Statler Hotel, Cleveland

Sept. 21-24—National Association of Foremen, annual convention, Statler Hotel and Masonic Temple, Detroit.

Sept. 29-Oct. 1 — Magnesium Association, mid-year meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 3-4—Steel Founders' Society of America, fall meeting Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 7-8—New England Regional Foundry Conference, sponsored by New England Foundrymen's Association and Massachusetts Institute of Technology, MIT, Cambridge, Mass.

Oct. 10-14—American Society for Testing Materials, Pacific Coast meeting, Fairmont Hotel, San Francisco

Oct. 13-15—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 13-14-15—Non-Ferrous Founders' Society, annual meeting, Cincinnati.

Oct. 17-21—American Society for Metals, metal congress and exposition, Public Auditorium, Cleveland

Oct. 21-22—Regional Foundry Conference sponsored by the Metropolitan, Philadelphia and Chesapeake AFS chapters, Stevens Institute, Hoboken, N. J.

Oct. 24-28—National Safety Council, 37th National Safety Congress and Exposition, Chicago

Oct. 26-28—National Metal Trades Association, annual convention, Palmer House, Chicago.

Oct. 27-28—Gray Iron Founders' Society, annual meeting, Edgewater Beach Hotel, Chicago

Oct. 28-29—Michigan Regional Foundry Conference sponsored by the Michigan AFS chapters, Michigan State College, East Lansing, Mich.

Nov. 3-5—Meehanite Metal Institute, annual meeting, Hotel Carter, Cleveland

Nov. 10-11 — National Foundry Association, annual meeting, Waldorf-Astoria Hotel, New York

Nov. 25-26 — New York Regional Conference, sponsored by New York AFS chapters, Syracuse University, Syracuse, N. Y.

Nov. 28-Dec. 3—Chemical Industries, exposition, Grand Central Palace, New York.

1950

(Tentative Schedule)

Jan. 16-19—Plant Maintenance Show and Conference, Public Auditorium, Cleveland.

Mar. 10-11—Ohio Regional Conference, Cincinnati, sponsored by Ohio AFS Chapters and University of Cincinnati.

Mar. 21-22 — Steel Founders' Society of America, annual meeting, Edgewater Beach Hotel, Chicago

May 8-12—American Foundrymen's Society, annual convention and exhibition, Cleveland

Oct. 12-13—Foundry Equipment Manufacturers' Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 19-20—Gray Iron Founders' Society, annual meeting, Netherland Plaza Hotel, Cincinnati

Nov. 8-10—National Foundry Association, annual meeting, Edgewater Beach Hotel, Chicago

Forms Soil Pipe Institute

The Institute of Cast Iron Soil Pipe and Fittings Manufacturers, comprising a membership of about 26 soil pipe and fittings manufacturers, was organized June 1. Robert Dick has been named executive secretary, with temporary headquarters at 490 Bleeker Ave., Mamaroneck, N. Y.

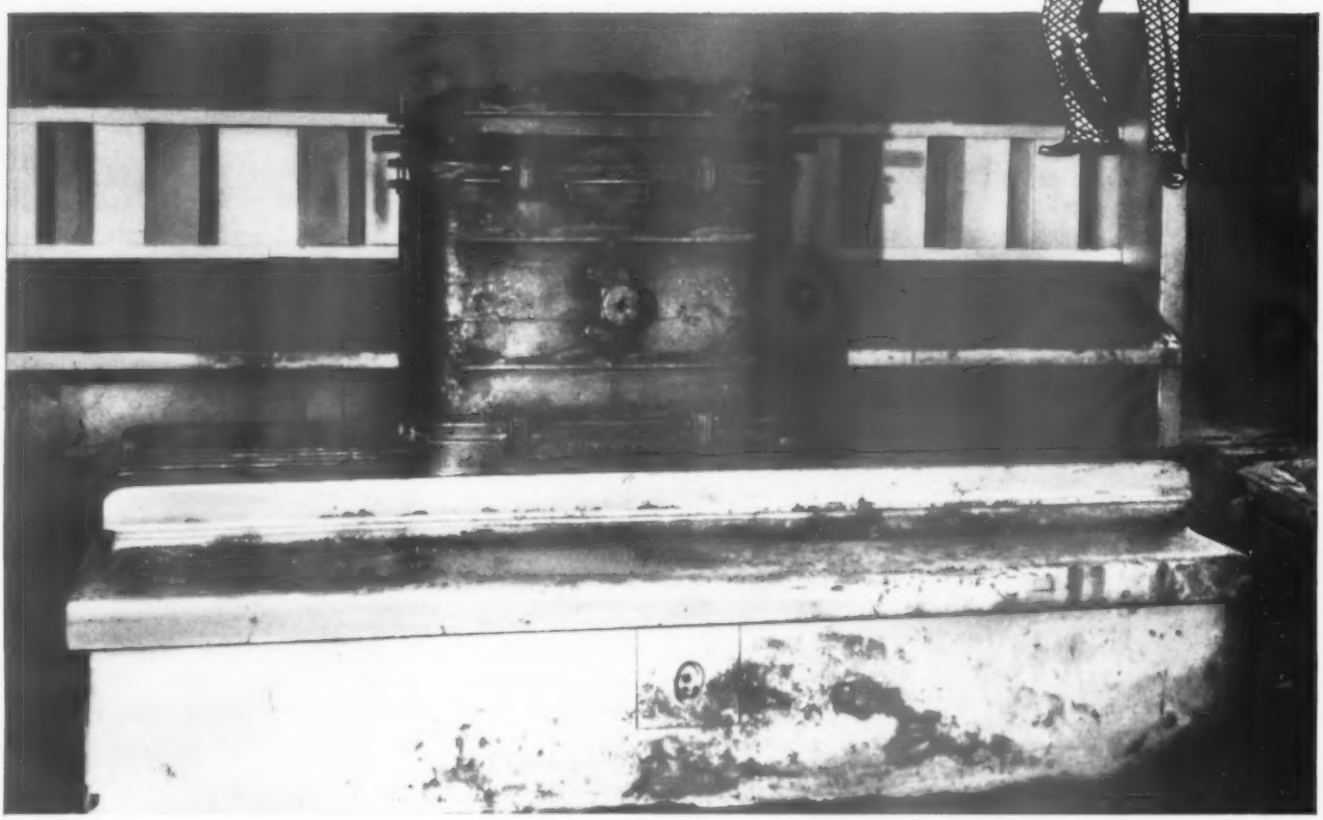
Officers of the new organization are as follows: President, J. J. Nolan, Jr., Central Foundry Co., New York; vice president, George L. Harberger, Eastern Foundry Co., Boyertown, Pa.; and treasurer, Deems W. Hallman, Hajoca Corp., Philadelphia. Members of the executive committee are: J. J. Nolan Jr.; Charles A. Hamilton, Alabama Pipe Co., and William Deyo, Anniston Foundry Co., both of Anniston, Ala.

Mr. Dick has been associated with Eagle-Picher Lead Co., Cincinnati, for the past 5 years, and prior to that was with Lead Industries Association for 11 years. He is one of the authors of the Wartime Emergency Plumbing Standards and for years conferred on the American Standards Association Code, representing lead interests.

Old Yields To New

An old industrial landmark in Barberton, O., has gone. The huge overhead Gantry crane of the Babcock & Wilcox plant, whose silhouette against the sky has been a familiar sight to two generations of residents and visitors, has been torn down. Built in 1906, the crane rose 61½ feet into the air and had a total bridge length of almost 227 feet. During the recent war it was in operation for 24 hours a day and continued that record until it was demolished. The crane has been replaced by a 15-ton regular overhead electric traveling crane of 100-foot span.

You can tell the difference . . . with your eyes shut!



The Robins Floatex Shakeout shakes the flask—not the building

You don't have to look at the name to recognize a Robins Floatex Shakeout when it's running.

The mere fact that you don't feel the building shake tells you at once that it's a Robins. And therein lies the big basic difference between a Robins Floatex and any ordinary shakeout!

No shaking effort is wasted with a Robins Floatex Shakeout. It shakes the flask—not the building! This is because it is the only *full-floating* foundry shakeout. The live frame and load *both* ride on big coil springs.

Naturally, you'd expect this full-floating principle to save wear and maintenance expense. And users' records prove that it does.

A Robins Floatex Shakeout offers you many other important money-saving features, too. For example, you can use it to knock out cores . . . right in the same operation with your flask shakeout!

Why not let a Robins engineer explain how the Robins Floatex Shakeout can make a big difference in *your* foundry output? Write Robins Conveyors Division today.

SEND TODAY for Bulletin 124-B. Gives you a complete picture story of benefits you enjoy with portable, stationary or self-discharging Robins Floatex Shakeout. Write Robins Conveyors Division, 270 Passaic Ave., Passaic, N. J.

ROBINS

FLOATEX SHAKEOUT

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

ASTM HOLDS 52nd ANNUAL MEETING

(*Continued from page* 94)

enough to give definite indications.

In a paper "An Analysis of Locked-in Stresses in Automotive Cylinder Blocks" by S. J. Stockett and H. W. Lownie Jr., Battelle Memorial Institute, Columbus, O., and presented by Mr. Stockett, the authors showed the method used. Strain gages were placed in various positions, and after readings were taken, the blocks were sectioned with a bandsaw to remove those portions containing the gages. Final measurements were then obtained on the gages to determine the stresses. It was mentioned that length of time the castings remained in the sand before shakeout had a considerable effect on whether or not cracking would occur.

Use Strain Gages

H. M. Hardy and T. O. Kuivinen, Cooper-Bessemer Corp., Grove City, Pa., in a discussion on "Strain Testing of Crankshafts, Engine Frames and Cylinders" which was presented by Mr. Kuivinen, showed how use of strain gage testing resulted in design changes which permitted reduction in weight of those parts as well as lower operating stresses in them. E. S. Clark, Meehanite Metal Corp., New Rochelle, N. Y., presented a paper prepared by Oliver Smalley of the same organization, on "Stress-strain Tests on Rectangular Cast Iron Beams."

Results of stress distribution on cast iron beams of various cross-sectional shapes were presented in a paper by H. M. Hardy and T. O. Kuivinen which showed that for all practical purposes, the normal bending theory can be used with sufficient accuracy. However, about 10 per cent should be deducted from the reverse bend or rotating beam endurance limit value for other than round sections. S. Low, Chapman Valve Mfg. Co., Indian Orchard, Mass., presented a paper on "Stress Analysis of a 125-lb Valve Assembly" which was prepared in co-operation with V. T. Malcolm of the same firm. The study resulted in design changes in a 12-in. flanged-end valve which provided lower residual stress in the parts.

Determination of stresses in a 6 x 4-in. cast iron tapping sleeve was discussed by J. W. Miner, American Cast Iron Pipe Co., Birmingham, and was the subject of a paper prepared in co-operation with E. C. Sears and E. D. McCauley of that firm. Data obtained resulted in a redesign of the sleeve which permitted reduction of stresses below the critical level. J. A. Cameron, Elliott Co., Jeannette, Pa., described the use of strain gages in determining the stresses in deaerating trays made of austenitic cast iron, and found that in certain areas it was 24,000 psi. It was found that stress-relief heat treatment reduced the stresses to a reasonable level without necessity of resorting to a change in design.

R. A. Flinn, American Brake Shoe Co., Mahwah, N. J., discussed briefly the metallurgical factors which may result in residual stresses, in a paper prepared by himself and R. J. Ely of the same firm, entitled "Stress Determination in Cast Irons for Railroad Service." He pointed out that the shape and amount of graphite may cause over a 50 per cent reduction in modulus of elasticity, a reduction of total elongation from 5.5 to 0.18 per cent, and a reduction of tensile strength from 78,000 to 25,000 psi. Type of matrix also may affect the stress-strain curve, since in some soft irons the shape of the graphite may cause permanent set at very low stresses.

Fillets Reduce Stresses

In the absence of G. A. Brewer, Massachusetts Air Industries, his paper, "Some Strain Gage Studies of Cast Iron Punch Press Frames," was presented by James A. Vanick, International Nickel Co. Inc., New York. The studies indicated that high stress concentrations occurred at the platen and gibway fillets in a 30-ton press. By increasing the fillets substantially the stresses were reduced to a satisfactory level.

Hyman Bornstein, Deere & Co., Moline, Iowa, presented a paper on "Location and Measurement of Stresses in Gray Iron Tractor Castings" which described the use of brittle lacquers to locate areas of high stress concentrations and application of wire gages to the areas to determine the amount of residual stress. Of the several tractor parts studied Mr. Bornstein mentioned sprocket gears cracking in the rim, and stress tests indicated a residual stress of 25,000 psi at that point. Annealing the castings reduced the stress to 3000 psi, and eliminated the trouble. Difficulty with wheels was eliminated by increasing the time for cooling in the sand by using a longer period from pouring to shakeout.

At various sessions reports of committee were presented. These included that of B-5 on Copper and Copper Alloys, Cast and Wrought which proposed a revision of ASTM designation B 208-46T on Tentative Recommended Practice for Preparing Tension Test Specimens for Copper-base Alloy Castings. This is presented in this issue in the "Foundry Data Sheet" on page 135. The committee also recommended numerous revisions in the following standards: Standard Specifications for Copper-base Alloys in Ingot Form for Sand Castings (B 30-48); Standard Specifications for Steam or Valve Bronze Castings (B 61-46); Standard Specification for Composition Brass or Ounce Metal Castings, (B 62-46); Standard Specifications for Bronze Castings in the Rough for Locomotive Wearing Parts (B 66-46); Standard Specifications for Car and Tender Journal Bearings (B 67-46); Standard Specifications for Leaded High-strength Yellow Brass (Manganese Bronze) Sand Castings (B 132-48).

Standard Specifications for Leaded Red Brass and Leaded Semi-red Brass Sand Castings (B 145-48); Standard Specifications for Leaded Yellow Brass Sand Castings for General Purposes (B 146-48); Standard Specifications for High Strength Yellow Brass (Manganese Bronze) and Leaded High-strength Yellow Brass (Leaded Manganese Bronze) Sand Castings (B 147-48); Standard Specifications for Aluminum Bronze Sand Castings (B 148-48); Standard Specifications for Leaded Nickel-brass (Leaded Nickel-silver) and Leaded Nickel-bronze (Leaded Nickel-silver) Sand Castings (B 149-48), and Standard Specifications for Silicon-bronze and Silicon-brass Sand Castings (B 198-48).

May Consolidate Grades

Committee A-1 on Steel reported that the subcommittee on Valves, Fittings, Pipings and Flanges for High-temperature and Subatmospheric Temperatures still has under consideration a proposed specification consolidating the essential grades in present specifications A 157, Alloy-steel Castings for Valves, Flanges and Fittings for High-temperature Service, and A 217, Alloy-steel Castings Suitable for Fusion Welding for High-temperature Service. When approved the new specification will immediately supersede those two present specifications.

Committee A-10 on Iron-chromium, Iron-chromium-nickel and Related Alloys recommended revisions in Tentative Specifications for Corrosion-resistant Iron-chromium and Iron-chromium-nickel Alloy Castings for General Application (A 296-46T), and Tentative Specifications for Heat-resistant Iron-chromium and Iron-chromium-nickel Alloys for General

(*Concluded on page* 122)

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1. Heavy forged steel trunnions, extra heavy roller bearings.
2. Special door locks — easily operated.
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4. Integral motor platform.
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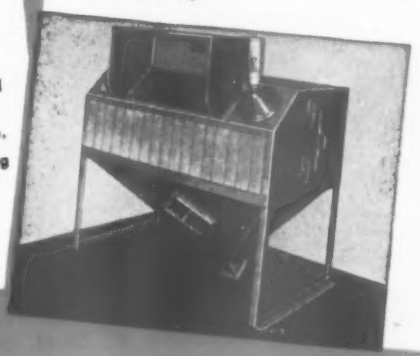

1. Two lights mounted at front to illuminate castings.
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2. Ample illumination.
3. Lined throughout with 3-16" wear plates.
4. Floor of grating and perforated plates.

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Small, compact cloth type dust filters for grinders and other small dust sources. Made in ten sizes for air volumes from 400 to 6000 C.F.M.

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1. More filter cloth—hence greater filtering capacity.
2. Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal.
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1. Handles quantities of castings, forgings, stampings, hardened steel parts.
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4. Work is constantly turned bringing bottom pieces to top.
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(*Concluded from page* 120)

Application (A 297-46T). Committee E-7 on Non-destructive Testing recommended that Tentative Industrial Radiographic Standards for Steel Castings (E 71-47T) be continued in its present form. It also recommended a revision in Tentative Definitions of Industrial Radiographic Terminology for Use in Radiographic Inspection of Castings and Weldments (E 52-45T).

Committee B-7 on Light Metals and Alloys, Cast and Wrought recommended revisions in Tentative Specifications for Magnesium-base Alloy Sand Castings (B 80-47T), Aluminum-Base Alloy Permanent Mold Castings (B 108-47T), and Aluminum-base Alloys in Ingot Form for Sand Castings, Die Castings and Permanent Mold Castings (B 179-47T). Committee B-6 on Die-cast Metals and Alloys recommended a new Tentative Specification for Zinc-base Alloys in Ingot Form for Die Castings.

Committee E-4 on Metallography recommended revision of Tentative Methods of Preparation of Micrographs of Metals and Alloys (Including Recommended Practice for Photography as Applied to Metallography) (E 2-44T). It reaffirmed Standard Definitions of Terms Relating to Metallography (E 7-27), and Recommended Practice for Thermal Analysis of Steel (E 14-33). The following tentatives were recommended to be continued without change: Preparation of Metallographic Specimens (E 3-46T), Tentative Recommended Practices for Identification of Crystalline Materials by the Hanawalt X-ray Diffraction Method (E 43-46T), and for Determining the Inclusion Content of Steel (E 45-46T).

Plans Gray Iron Safety Program

A national gray iron foundry safety committee has been appointed by Hermann P. Good, president, Gray Iron Founders' Society, Cleveland. Recently authorized by the society's board of directors, the committee will formulate plans for a safety program for the industry, including preparation of a code of safe working practices for each department of the foundry.

Raymond L. Collier, executive vice president of the society, stated that stress will be laid on the advisability of foremen and supervisors taking the necessary time to drill the employees in their respective departments on occupational hazards that exist therein and the safe working procedures which will obviate all or most of the injuries commonly sustained by workers engaged in such occupations.

Members of the committee include the following: G. A. Riley, supervisor of safety, American Brake Shoe Co., New York, chairman; Edmund Gilliam, safety director, Eaton Mfg. Co., Detroit; Kenneth R. Nichols, safety director, Cincinnati Milling Machine Co., Cincinnati; Frank O'Malley, personnel director, Ferro Machine & Foundry Co., Cleveland; and Harold Wheeler, personnel director, Superior Foundry Co., Cleveland.

AFS Chapter Officers Meet in Annual Conference

CHAIRMEN and program chairmen of the various chapters of the American Foundrymen's Society met at the Stevens Hotel, Chicago, June 30-July 1, for an intensive discussion of plans affecting the conduct of individual chapters and the society during the coming year. This sixth annual conference of chapter officers was under the chairmanship of Edwin W. Horlebein, newly elected national president and president of the Gibson & Kirk Co., Baltimore.

Considerable time was devoted to discussion of details connected with the monthly chapter meetings and the duties of individual officers as they relate to program building and educational activities. Functions of various departments of the national headquarters in Chicago were explained by staff members, including William W. Maloney, secretary-treasurer; S. C. Massari, technical director; Terry Koeller, promotion manager; Herbert F. Scobie, editor, *American Foundryman*, and Joseph E. Foster, technical assistant.

Also in attendance at the conference were William B. Wallis, immediate past president of AFS and president of the Pittsburgh Lectromelt Furnace Corp., Pittsburgh, and Walton L. Woody, newly elected vice president of the society and vice president of the National Malleable & Steel Castings Co., Cleveland. Featured speakers on the subject of educational activities were Fred G. Sefing, International Nickel Co., New York and William J. MacNeill, Dayton Malleable Iron Co., Dayton, O., both national directors, and George K. Dreher, executive director of the Foundry Educational Foundation, Cleveland. Picture indicates a hot-weather session.

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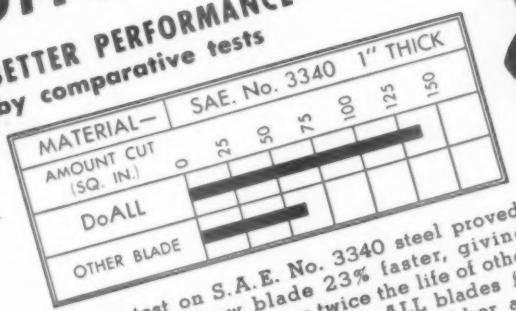

Above test on S.A.E. No. 3340 steel proved DoALL bandsaw blade 23% faster, giving better finish and having twice the life of other bandsaw blade. There are DoALL blades for cutting any material from cloth, rubber and wood to hard metals and even glass!

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Latest achievement in bandsaw blades, *available only at DoALL*, are the Claw-Tooth blade (negative angle cutting rake); Diamond-Tooth blade for cutting glass and ceramics; Tungsten-Carbide blade for cutting extremely hard and abrasive materials.

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Steel "strip-out" blade box saves users' time, protects fingers, keeps blade undamaged. Slot shows footage left in box.

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Coast-to-coast network of factory-trained service engineers (one relatively close to you) available to help solve your sawing problems. Let DoALL determine correct blade, speed, feed, lubricant if any, etc. Write today to start getting benefits of this valuable service.

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Because of DoALL's many years of advanced technical research and exhaustive testing on production lines, DoALL Contour Saws are famous in every industry, everywhere. DoALL machines — many models — enable you to bandsaw anything. Write for details on how DoALL "tailors" a saw to fit your job.

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By EDWIN BREMER

FOUNDRY Developments

LATEST development in desulphurization procedures in apparatus for feeding a controlled amount of dense soda ash to the bath of molten iron. Soda ash is added continuously, and the amount is adjusted to provide the desired sulphur removal. Point of entry of soda ash to the molten iron bath is such that an intimate reaction is obtained between the two, resulting, it is claimed, in high efficiency. Sulphurs as low as 0.035 per cent have been obtained in experimental runs, with the cupola iron at the spout containing 0.120 per cent. Further details on the procedure will be published in one of the forthcoming issues.

* * *

RECENT reports indicate that ingot steel produced in basic-lined side-blow converters may soon be a commercial proposition. The melting unit, termed a "turbo-hearth," is being studied jointly by Jones & Laughlin Steel Corp. and Carnegie-Illinois Steel Corp. Originally Jones & Laughlin experimented with an acid-lined side-blown converter with a view of reducing production costs of steel while Carnegie-Illinois was studying the use of a basic-lined unit at Battelle Memorial Institute. In the course of the development work the interests of the two firms converged, and further investigation is being conducted jointly.

* * *

STUDY of 19 copper-base alloys, both cast and wrought, was conducted by Allison Butts, Lehigh University and Paul L. Reiber Jr., Carnegie-Illinois Steel Corp., to determine "Magnetism in Copper Alloys: The Effect of Iron as Impurity", and the results reported at the recent ASTM meeting indicate that the following casting alloys gave good ratings: Ounce metal or 85-5-5-5; valve composition or 81-3-7-9, and commercial yellow brass or 67-1-3-29 provided the iron content was 0.01 per cent or under. Those same alloys with commercial G or 87-8-1-4 when given a solution-quenching heat treatment were rated best, and under the same conditions composition M or 88-6-1.5-4.5 and compositon G or 88-8-4 were rated good. These data are important in construction of instruments containing compass needles or other magnetic devices.

* * *

INVESTIGATION at the National Bureau of Standards, Washington, by T. G. Digges, Carolyn R. Irish, and N. L. Carwile indicates that the effectiveness of boron in enhancing the hardenability of certain steels is due entirely to its action while in solid solution in austenite. Only the portion of the boron which is in solution at the time of quenching contributes toward an increase in hardenability. Boron undissolved or in the form of compounds is either without effect, or possibly decreases hardenability by acting as transformation centers for austenite in the temperature range where pearlite is formed.

* * *

SUCCESSFUL experimental use of electrolytic manganese in the production of steel castings is described in a publication released recently by the Bureau of Mines. Results of the study showed that electrolytic manganese could be used in acid steel foundry practice and that the addition of this material did not impair the quality of the steel or reduce the recovery of manganese. In no case were the castings unsatisfactory, and additional advantages of using pure manganese were indicated, according to the report. Free copy of the "Report of Investigations 4482, Electrolytic Manganese in Acid Electric Steel Foundry Practice, Tests at National Malleable & Steel Castings Co., Sharon, Pa." may be obtained from Publications Distribution Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13.

View of the 20 creep testing units recently installed at the Research Laboratory, National Tube Co., Pittsburgh

* * *

PISTONS of bimetallic construction for heavy-duty automotive use are contemplated by United Engine & Machine Co., San Leandro, Calif. Main body of the piston will be aluminum alloy, with a nickel alloy cast iron ring carrier for the top ring. Aluminum body and cast iron ring carrier will be bonded together by the Al-Fin process developed by Fairchild Engine & Airplane Corp. A number of other bimetallic construction methods also are said to be under consideration.

* * *

LIQUID nitrogen at —300°F is used at Bell Aircraft Corp., Buffalo, to provide tight fits for steel bushings inserted into magnesium castings. Bushing, made slightly oversize, is immersed in the liquid nitrogen which results in linear and volumetric contraction. The magnesium casting at the same time is heated to about 300°F, causing a slight expansion of the bore. Cold bushing is inserted smoothly into the warm casting, and the two are allowed to come to room temperature at which it is impossible to pry them apart.

* * *

MORE than 140 new American Standards approved since January, 1949 are included in the midyear list of standards and special publications just issued by the American Standards Association Inc., 70 East 45th St., New York 17. The list shows a total of 1124 standard specifications, methods of test, building requirements, dimensions, safety codes, definitions and terminology in all fields of engineering as well as for materials and equipment used by the ultimate consumer.

WHEREVER THE HOT STUFF HITS

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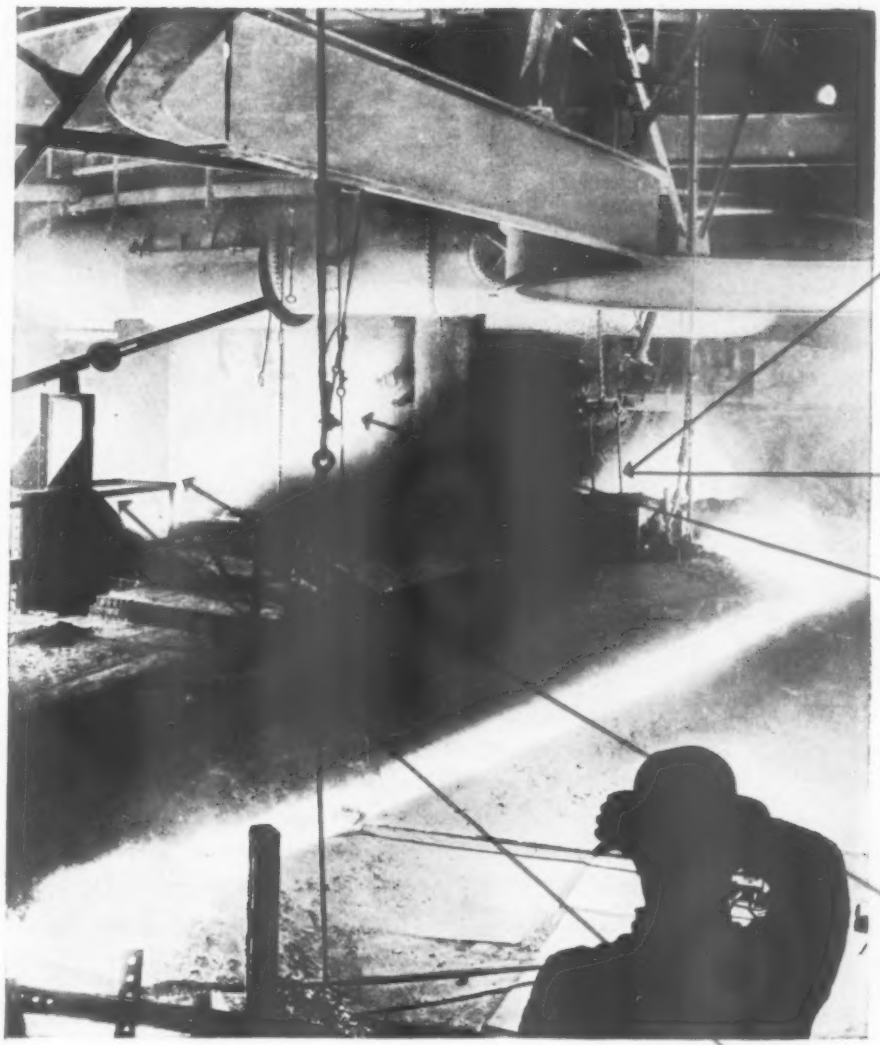
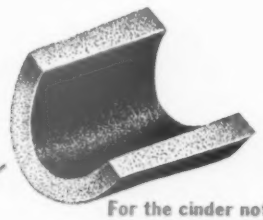
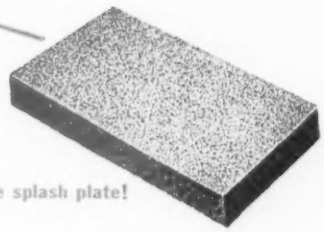




For the cinder notch liner!

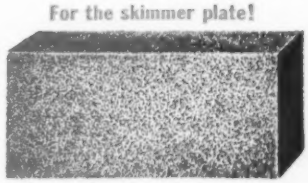
For the cinder notch plug!



For the splash plate!

For the runout troughs!

For the skimmer plate!



● "National" carbon is now firmly established for blast furnace linings. It is being used outside the furnace as well—wherever there is contact with molten material—for the splash plate, runout troughs clear down to the ladle, skimmer plate, cinder notch liner, and cinder notch plug.

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READERS' COMMENT • • •

Seeks American Correspondent

TO THE EDITORS:

As a young metallurgical chemist of graduate standard, I would very much like to get in touch with a young American of similar profession. Would you be kind enough to help me in this matter? My aim, of course, is to exchange ideas and views concerning all types of metallurgical processes, particularly with regard to iron and steel. I am a member of the Institute of British Foundrymen and often read your magazine, which I find most helpful and interesting. I am 27 years of age and am taking a final degree in metallurgy next year.

GEROLD H. STEVENS
42 Belle Vue Grove
Grove Hill
Middlesbrough, Yorkshire, England

* * *

How To Break Heavy Scrap

TO THE EDITORS:

This letter was prompted by a question and answer in a recent issue of THE FOUNDRY, regarding breaking and melting heavy scrap in the cupola. We appear to have the answer. If you can bring anything to our yard, including the big Russian anvil from the Black Sea area, and sell it to us for a low dollar, we'll melt 'er! Not all in one piece of course, but we'll melt 'er.

When my partner and I decided to enter the world's second oldest profession in the fall of 1946, we did so with considerable trepidation. We asked an old foundryman to get us started. He was a cost cutter of the old school. One thing he insisted upon was the necessity of breaking all scrap, even plow points, into small pieces before charging the 30-in. diameter cupola. When this operation was extended to cylinder blocks and other light castings it raised the cost of melting to a prohibitive figure. We were limited in the type and quality of scrap we could buy.

Then came to hand the mystical book with the golden key, *Tales From The Gangway*, published several years ago. Chapter 32 told all about melting large pieces of scrap from 800 to 1400 lb in a 28-in. diameter cupola. We began to charge heavier and heavier pieces of scrap, and for a time we watched anxiously for the cold iron and other disagreeable things, cheerfully proph-a-sied by the ancient one. In a short time we were charging 700-lb diesel cylinders and pouring gas burners from the resulting metal. If you ever made these particular gas burners, you know that the iron must be hot.

Our plant is located well out of town. We experimented with blasting large castings. We broke them into pieces that would go in the charging door of the cupola. That is the only criterion. Any piece that will go in the door will melt. Any nit-wit can break castings by this method. The trick is to do it safely and retain all the pieces. At the prevailing price for scrap the foundryman cannot afford to have a 200-lb hunk sail away into the wild blue yonder; to say nothing of the building maintenance involved.

The job takes judgment and experience. Judgment is first because without it there is no chance of getting the experience. With a minimum of encouragement I could write a small pamphlet on this subject, telling how to do it and avoid the errors we made in the early trials. We drove a fist-size chunk through my house and we put several through the foundry building. All blasting is done after quitting time.

The old foundryman also missed the item about mixing flour with the botting clay. We found that sawdust from the pattern shop was better than flour and costs nothing. Foundrymen usually insist on iron wheels or solid tires on mobile equipment to prevent casualties when moving through molten metal on the floor. We have had no trouble with pneumatic tires. We have distributed many tons of iron with a sulky ladle equipped with ball bearing wheels and pneumatic tires. These tires have prevented spills at high speed. Spilled metal is held to a minimum, but where it exists the wheels are driven through as fast as possible.

In common with many foundrymen we are melting all scrap charges. We have had practically no trouble with hard iron. Castings are not as soft as butter, but they are perfectly machinable with rigid and properly maintained machine tools. Brinell runs from 187 to 229. We select the scrap carefully, add the required amount of silicon and manganese. Soda ash gets rid of that ubiquitous sulphur. Where does it all come from, anyway?

WM. BAUM
Wilhelm Baum Machine Works
South Haven, Mich.

Comments on Graphitization

TO THE EDITORS:

The exchange paper of H. G. Hall before the Association Technique de Fonderie, published in the June and July issues contains many points of interest. This writer does not wish to start a controversy in a field in which there is too little experimental evidence and possibly too little opportunity for successful experimentation to justify an arbitrary position. However, there are two points in Mr. Hall's paper which seem to the writer to be improbable and to which some attention should perhaps be drawn.

The first of these is the attempt to explain the effect of boron by considering the aluminum content of the ferro-boron. Since boron is effective in accelerating graphitizing when present in amounts of 0.001 per cent, it seems that the amount of aluminum present in ferro-boron, coupled with the easy oxidizability of that element, does not furnish a sufficient source of aluminum to give that element major importance in the determination of the result.

Apparently Mr. Hall is of the opinion that prequenching alters the distribution of the sulphide inclusions. The present commentator has no knowledge of this subject whatever, but judging from what happens in steel practice, he sees no possibility of such a change of geometric distributions at temperatures at which the whole system remains solid.

It is not impossible that to produce a temper carbon nodule one has to have as a nucleus a particle of some variety, say a sulphide situated in a cementite-austenite interface. If then prequenching produces more area of interface, it produces a greater opportunity of having a sulphide particle in the interface and a higher nodule number. If the sulphide particle is not necessary, then the argument which Mr. Hall quotes from the writer can be used directly.

It is perhaps only proper to say in this connection that that explanation was originally by C. H. Junge, who was a member of the commentator's staff. It was first presented publicly by Mr. Junge in an oral discussion at an AFS convention.

DR. HARRY A. SCHWARTZ
Manager of Research
National Malleable & Steel Castings Co., Cleveland

British Foundrymen

HOLD 46th ANNUAL MEETING

(*Continued from page* 86)

Ironmonger for their paper on "Making a Large Eight-Cylinder Diesel Crankcase."

To C. B. Van der Ben and H. Haynes, for their paper on "The Production of Gray Iron Castings."

To A. R. Wizard for his paper on "Monumental Statuary Casting," in which he described the casting of the statue of the late President Roosevelt in Grosvenor Square, London.

To J. H. Williams for his paper on "Casting Inspection."

The president then proposed that Vincent C. Faulkner, editor of *Foundry Trade Journal*, be elected an honorary member of the institute for life in recognition of the important contributions which he had made to the progress of the institute, which he joined in 1908, and to the industry. This proposal was adopted unanimously.

Officers Elected

The meeting then proceeded with the election of officers for the ensuing year. N. P. Newman was unanimously elected president. J. J. Sheehan, director of Coneygre Foundry, Ltd., Tipton, Staffs. was unanimously elected senior vice president, and Colin Gresty, general foundry manager and chief metallurgist, the North-Eastern Marine Engineering Co. (1938) Ltd., Wallsend-on Tyne, was unanimously elected junior vice president.

The president-elect then proposed a vote of thanks to the retiring president, R. B. Templeton, which was seconded by J. Gardom and received with acclamation. Mr. Newman then took the chair and read telegrams of greetings which had been sent by President Wallis, of the American Foundrymen's Society, President Ballay of the Association Technique de Fonderie, Paris, and from H. J. Sheppard, an Australian member.

The president proceeded with the presentation of his presidential address, in which he referred particularly to the human problem in industry, with special reference to the foundry industry. He stated his belief that "social skill or technique is just as important as material technique in dealing with the problems which exist in our foundries today."

He also emphasized that it is one of the responsibilities of the institute to set up a well devised program for developing leadership, through education, by encouraging foremen's courses and the like. The important work of providing education and training for youths who desire to enter the industry must continue with ever increasing success if the vital supply of "new blood" is to be maintained. Equal energy should be expended in an endeavor to provide the means to improve the education and leadership of management and foremen; foremen, said the president, are the essential backbone of the industry.

The address was followed by the Edward Williams Lecture, which was delivered by Prof. Hugh O'Neill, D. Sc., of University College, Swansea. The subject of the lecture was "Metal Founding Through the Ages." In a fascinating manner, the author discussed the ancient history of cast metals. He reviewed the history of founding with special mention of work in cast iron and the use of coal before the Christian era; he referred to the modern developments of casting centrifugally, continuously and in dies. In his concluding remarks he said that historical and aesthetic considerations help to link science with art and should not be ignored by metallurgists.

Recipient of the British Foundry Medal, Mr. Young is chief assistant foundry manager of the Clyde Foundry, Harland & Wolff Ltd., Glasgow. He joined the electrical department of the company at Queen's Island, Belfast, in 1908, where he attended evening classes in Belfast Technical College for technical training in his work. In 1918 he was appointed assistant manager in the electrical department, and in 1922 was transferred to the company's new Clyde Foundry in Glasgow. The work appealed to him and he attended evening classes at Royal Technical College, Glasgow, where he studied foundry practice and metallurgy. Shortly afterwards he took charge of all metal melting in the foundry and later became chief assistant foundry manager. Mr. Young joined the Scottish branch of the institute in 1931 and served as its president in 1943.

D. H. YOUNG

The following papers were presented at the technical sessions:

"Stress-Relief Heat Treatment of Alloy Cast Iron," by M. M. Hallett and P. D. Wing, respectively, chief metallurgist and research metallurgist, the Sheepbridge Stokes Centrifugal Castings Co. Ltd., Chesterfield.

Many papers have already been given on the subject, but none appears to have given quantitative data on the magnitude of the stress and, therefore, little is known of the degree of stress remaining in a casting. The authors have endeavored to furnish a more complete picture of the whole operation of stress relief treatment. They have also extended their investigations to the lighter alloys. Ring test pieces were used in their experiments.

The authors arrive at the following conclusions:

1. In comparatively low-alloy, sand cast or centrifugally cast iron, over 80 per cent relief of stress may be attained by heating to a temperature of 600° C for one hour. This is not accompanied by any deterioration in mechanical properties or in microstructure.

2. In high-alloy iron of the 33 per cent chromium and Ni-Resist class, it is necessary to heat to 650° C to obtain a satisfactory degree of stress relief. This does not affect the mechanical properties of the 33 per cent chromium iron, but may reduce the tensile strength of Ni-Resist by about 10 per cent.

3. The magnitude of the initial stress does not have a predominating effect on the relief of stress at any given temperature, but in all four materials there is a tendency for the percentage relief of stress to be higher with a higher initial stress. This is particularly marked in the high alloy irons at moderate and low temperatures.

4. Prolonging the time of treatment at 450° C greatly increases the amount of stress relief, but the rate is prohibitively slow.

Ageing at room temperature for several months appears to lead to a maximum relief of stress of about 10 per cent. The practice of stress relief by heating to an elevated temperature is, therefore, greatly to be preferred to the practice of weathering at atmospheric temperature.

In subsequent discussion Dr. A. B. Everest, Mond Nickel Co., said that he still believes weathering at room temperature serves a useful purpose, especially if a low degree of stress relief was required, but relief at the higher temperatures is certainly the best when available. Dr. Angus pointed out that for large and heavy castings it is often difficult to have the furnaces required for their treat-

(*Continued on page* 130)

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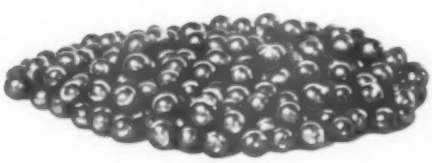

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(*Continued from page* 128)

ment, and that the relief obtained at atmospheric temperature, giving 10 to 12 per cent relief, is very useful; moreover, heat treatment may set in certain stresses that are as bad as those to be removed.

"The Influence of Heating Rate in Malleable Iron Annealing," by S. W. Palmer, British Cast Iron Research Association.

Recent developments in the annealing of malleable cast iron have tended to reduce the length of the annealing cycle. This has been accomplished to some degree by the control of chemical composition, and to some extent by the use of annealing furnaces which permit more rapid heating and cooling rates. The introduction of the electrically heated furnace using a controlled gaseous atmosphere is having an important influence in both whiteheart and blackheart annealing practice. The use of such a furnace permits the elimination of packing material and annealing pots, and a considerable shortening of annealing cycles can be obtained.

The object of the paper is to show that the rate of heating has an important influence on the process of graphitization after the top annealing temperature has been reached, and that the final microstructure obtained depends to a considerable degree upon the rate of heating. In fact, it would appear that if the heating rate be increased beyond a certain point, then the object of this increased rate, namely, the shortening of the annealing cycle, might well be defeated.

Discussing the paper, H. G. Hall said that research work on malleable iron is at least ten years in advance of practical applications, and that the type of research dealt with in the paper should help in arriving at the type of modern furnace required. He said that work is being done in the same direction in America, that there was general agreement with the conclusions arrived at here, but the Americans appeared to minimize the effect of the heating rate. He pointed out that, in blackheart, a longer rate of heating improves not only elongation, but also the tensile strength.

"The Effect of Stripping Temperature on the Properties of Pearlitic Grey Cast Iron," a report of the subcommittee T. S. 18 of the Technical Council.

With increasing rates of production, particularly in mechanized foundries, there is a tendency for castings to be stripped from the mold soon after they have been poured, and while they are still at relatively high temperatures. Following variations in the properties of certain iron castings produced during the war, some fears existed as to the possible effects of high temperature stripping on the mechanical properties of the castings and on their liability to distortion. In order to investigate these questions, the subcommittee was appointed by the Technical Council on Sept. 11, 1946.

Results described in the report show that, on the whole, the changes in the characteristics of castings, resulting from changes in stripping temperature over quite a wide range, are not very marked. There is a slight air hardening when castings of medium section are stripped at a high temperature above the critical point. The air hardening causes a small increase in tensile strength, and an increase of 20 to 40 points in brinell hardness. Stripping at high temperatures does not cause notable changes in castings of thin section, below, say, ½ in., since in these sections the rate of cooling in the sand mold is not very different from that in still air.

The tendency for tensile strength values to be increased is not disadvantageous, but it may be doubted whether it is a practicable operation regularly to produce castings of slightly higher tensile strength by normally stripping at a higher temperature, and still maintain a constant tensile strength level. The concurrent increase in brinell hardness may be a disadvantage particularly with irons of fairly high alloy content.

The effects of stripping at a high temperature on consequent distortion are more complex and would have to be determined for each particular casting. It does appear that a high stripping temperature reduces distortion and internal stress in a casting containing widely spaced limbs differing in their section. Where the limbs are in closer proximity, and do not differ very markedly in section, stripping at a high temperature might even lead to greater distortion. The report considers only those cases in which the casting is completely stripped at a given temperature, and not cases of partial stripping of a casting, thus exposing different sections to different cooling conditions.

Dr. Angus, opening the discussion, confirmed from work done at the British Cast Iron Research Association that, for particular types of castings, stripping at high temperature reduces the chances of internal stress. H. J. Young pointed out that it is possible to obtain a tensile strength of a couple of tons higher by pouring a test piece in a mold with 4 in. of sand instead of one with ¼-in. With regard to stresses, he said that these are due to external causes more than to internal ones. A speaker mentioned that the hardness found at the edge of a casting was definitely not a chilling effect. Mention was also made of evidence of considerable capture of sulphur near the skin of the casting.

"Factors Controlling the Hot Tearing of Aluminum Casting Alloys," by D. C. G. Lees, metallurgist, the Aluminum Development Association.

Super-purity aluminum and the eutectic alloys do not show tearing even when cast under severe restraint; initial additions of alloying elements introduce tearing which increases and reaches a maximum at about the limit of solid solubility under the conditions of freezing, subsequently decreasing and falling to zero.

The factor principally controlling the severity of tearing is the extent of the brittle range of temperature from the point at which the alloy first becomes coherent to the effective solidus under the relevant conditions. In this range the alloy is brittle and liable to crack under the influence of stresses set up by the restraint of free contraction or by premature handling.

(*Concluded on page* 133)

Awarded the Oliver Stubbs Gold Medal, Mr. Harbach is chief metallurgist of Worthington-Simpson Ltd., Newark. He received his early metallurgical training at the Staffordshire Engineering and Metallurgical College and at W. & T. Avery Ltd. He has been a member of the IBF since 1934 and was president of the Lincoln Section in 1938-39 and of the East Midlands Branch in 1942-43. Since 1941 he has been a branch delegate to the General Council and is currently serving on the Education Committee, and chairman of the Technical Sub-committee T.S. 30, which is investigating the use of synthetic resins in the foundry. Mr. Harbach has lectured on metallurgy in connection with the City and Guilds examination in foundry practice and has taken a keen interest in the education and training of foundry apprentices.

G. L. HARBACH

Bulletin on SUPER REFRACTORIES

by CARBORUNDUM
TRADE MARK

NO. 4 AUGUST, 1949

How To Use Super Refractories

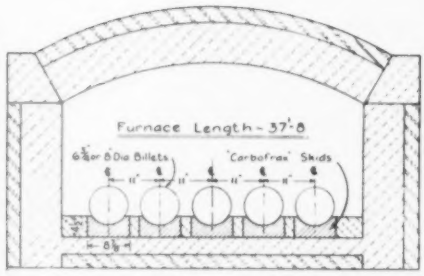
In most installations, there is at least one area where refractory life is curtailed by unusual conditions. Perhaps only a few brick—a tile or two—may be involved. Nevertheless, their replacement means furnace shutdowns . . . production delays . . . increased maintenance. In such cases, Super Refractories by Carborundum can prove to be profitable. They are better fitted inherently to withstand rigorous service. Specialized characteristics enable them to lick localized trouble spots. Improved overall refractories performance eliminates frequent, expensive outages. Definite savings result from the wise, even though limited, use of these super refractories with other less costly refractories.

More extensive use of Super Refractories by Carborundum may be indicated for some jobs. Possibly top performance will be insured only through their full utility. Numerous accepted processes, involving large scale usage, are practical and economical simply because of the well-considered application of these products.

Super Refractories by Carborundum are produced from several different basic materials. Each type is available in many varieties to better meet a wide range of service requirements. For best utilization, it is important to consult with our refractories engineers. Their recommendations are based on broad experience.

Physical Properties of Super Refractories by CARBORUNDUM
TRADE MARK

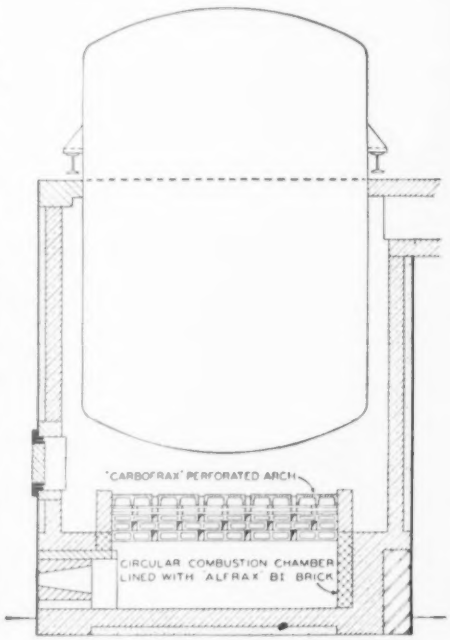
	CARBOFRAX	MULLFRAX	MULLFRAX S	ALFRAX K	ALFRAX B	ALFRAX BI
Heat Conductivity at 2200°F. in BTU/hr. sq. ft. and °F. /in. of thickness	109 BTU	16 BTU	9 BTU	24 BTU	12 BTU	7 BTU
REFRACTORINESS PCE CONE	37-40	38-39	37-38	37-39	39-40	38-39
SPALLING RESISTANCE	High	High	High	Good	Good	Good
ABRASION RESISTANCE	High	Medium	Medium	High	Medium	Low
THERMAL EXPANSION (25°—1400° C.)	.0000044	.0000059	.0000069	.0000074	.0000086	.0000086
MODULUS OF RUPTURE @ 2460° F. PSI	800-3125	100-250	175-475	100-1050	100-225	50-100
WEIGHT 9 IN. STRAIGHT	9.25 lbs.	9 lbs.	8 lbs.	10.1 lbs.	7.25 lbs.	4.8 lbs.



CARBOFRAX Skid Rail Life Increased From Weeks To Years

This extrusion-mill furnace is now equipped with CARBOFRAX silicon carbide skid rails. Formerly, a chrome hearth was used in the hot zone and alloy rails in cooler sections. This chrome-alloy combination required expensive maintenance and replacement every 2 to 5 weeks. In addition, pile-ups and wrecks were caused by rail warpage.

With the installation of CARBOFRAX skid rails, 3 years life is obtained before replacement is necessary. Frequent furnace outages are eliminated. Production is increased. Operating costs have dropped. Rails remain true—without warpage. There are no wrecks or pile-ups. Because frictional resistance is greatly reduced, brass billets are slid through the furnace more easily.



Set Kettle Utilizes Job-Fitted Super Refractories

Here is a case where judicious use of two different refractory materials resulted in extended service life of both the set kettle and setting. In addition, simplified and accurate temperature

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Address all correspondence to: Dept. D-89, THE CARBORUNDUM COMPANY, Refractories Division, Perth Amboy, New Jersey

Continued on other side →

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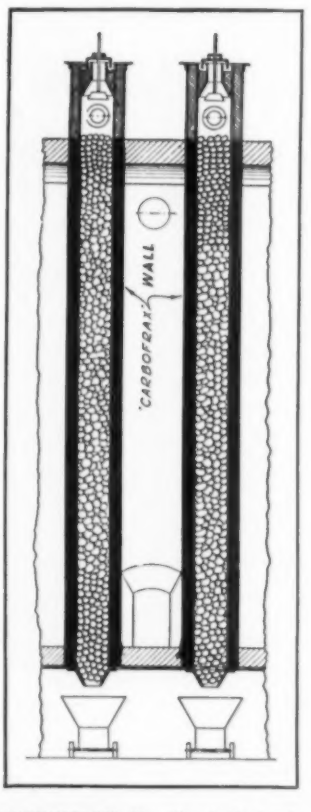
control has been achieved along with lower fuel costs.

Because of their high mechanical strength and thermal conductivity, CARBOFRAX silicon carbide shapes were selected for the arch. More rapid and even radiation of heat to the kettle is provided. Lower temperatures are required in the combustion chamber. Moreover, remarkable resistance to spalling and cracking provides "insurance" against service interruptions.

Light-weight ALFRAX BI fused alumina insulating brick, applied to the combustion chamber to reduce heat storage in the setting, provides more accurate temperature control.



CARBOFRAX Vertical Retorts Open Door to New Processes

Several newly developed chemical and metallurgical processes are now not only possible but also economical through the use of CARBOFRAX refractories as the structural material for forming retorts. Restricting limitations that existed formerly are removed. Because of their high thermal conductivity, only moderate thermal gradients are required to transmit heat rapidly through retort walls. Close temperature control is provided. Consequently, combustion chamber temperatures are lower, fuel efficiency is improved, and refractory difficulties are minimized. Great strength at high temperatures plus mechanical and flame abrasion add long uninterrupted service to the other advantages of a CARBOFRAX vertical retort.

Operator Summarizes Advantages of CARBOFRAX Setters

Several important advantages of using CARBOFRAX setters are concisely summarized in this report from a producer of sanitary ware:

"Since going into operation (over 6 mos.) there have been absolutely no losses in tank or bowl setters due to firing cracks. All losses have been due to mechanical handling or dropping. There has been no sagging, warping, deformation or growth in size although the setters are supported only on the ends by firebrick and have no continuous support underneath."

Operating data: Firing Temperature—Cone 11. Cycle—33½ to 36 hours.

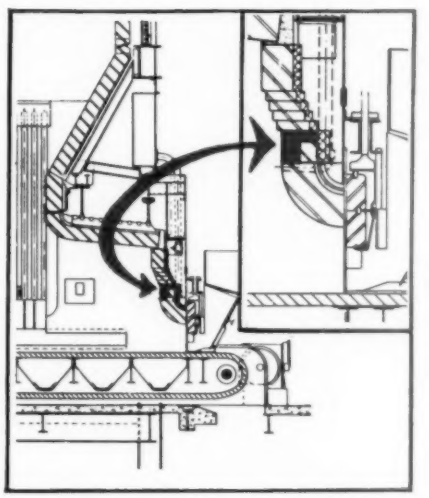
Judicious Use of Super Refractories Licks a Trouble Spot

Three courses of CARBOFRAX silicon carbide brick were all that were required to solve the troublesome problem of uneven secondary air distribution in this boiler furnace.

The trouble was traced to fingers of slag which formed above the air nozzles in the front and rear walls. This slag deflected the air streams enough to disturb secondary air distribution. Fuel burned unevenly. Shut-downs were frequent and fuel efficiency was lowered. When CARBOFRAX brick were installed just above the air jets, the trouble was eliminated. Slag can not anchor on the smooth, hard, dense surface of this clinker-resistant Super Refractory.

This Flue-Connector Lining Has Seen 10,000 Hours of Service

There is a distinct lack of carbon build-up in this unretouched photo of a flue connector lining after 10,000 hours of service. The hard, dense, smooth surface of CARBOFRAX lining provides no anchorage for these obstructions. Equally important is the freedom from erosion despite the fact that the lining has been subjected to the beating of millions of abrasives particles travelling at terrific velocity. Cleaning is minimized, down-time for repairs is reduced.



A complete file of informative literature covering super refractories is available through The Carborundum Company. There are facts and figures on installations in specific fields. To obtain copies of reports, booklets and catalogs of particular interest is a simple matter. Merely select from the list printed here. Copies will be sent you at once. No obligation, of course.

Super Refractories by CARBORUNDUM (general catalog)

Super Refractories for the Ceramic Industry

Super Refractories for the Process Industry

Super Refractories for Boiler Furnaces

Super Refractories for Heat Treatment Furnaces

Super Refractories for Gas Generators

The FRAX Line of Cements

CARBOFRAX Refractory Skid Rails

Bulletins Nos. 1, 2, 3 on Underdrain Systems and Diffuser Media

Dept. No. D-89

THE CARBORUNDUM COMPANY
Refractories Division
PERTH AMBOY, NEW JERSEY

(*Concluded from page* 130)

Under favorable conditions, cracking may be averted by the process of accommodation, i.e., slight rearrangement of the grains before freezing is complete and, further, by the flow into incipient cracks of eutectic liquid derived from portions of the casting in which freezing is less advanced. Thus, freedom from hot tearing may be regarded as being a function of the extent of the brittle range, or of the proportion of autectic present. Further, any factors influencing the distribution of residual liquid may affect the incidence of hot tearing. Among these must be mentioned grain size and gas content. Grain refinement reduces the severity of tearing; dissolved gases during freezing may also reduce the severity of tearing in alloys not greatly prone to the defect.

(*To be concluded next month*)

MALLEABLE SOCIETY HOLDS ANNUAL MEETING

(*Concluded from page* 80)

production schedules in recent years frequently was at the expense of quality, a condition which must be corrected, he added. Sales techniques likewise have been neglected and require renewed development. The importance of labor saving machinery in reducing costs should not be overemphasized, Mr. Carter warned, since a proper organization and efficient control are the primary requisites for profitable operations.

Reports of the past year's activities of various standing committees of the society were presented as follows:

Plant Operations, by George J. Ehrendt, Eastern Malleable Iron Co., Naugatuck, Conn.; Membership, by Harry M. Laws, New Haven, Conn.; Cost Accounting, by John A. Wagner, Wagner Malleable Iron Co., Decatur, Ill.; Budget, by C. A. Gutenkunst Jr., Milwaukee Malleable & Grey Iron Works, Milwaukee; Technical Council, by C. F. Lauenstein, Link-Belt Co., Indianapolis; Program, by J. T. Llewellyn II, Chicago Malleable Castings Co., Chicago; Education, by Anthony Haswell, Dayton Malleable Iron Co., Dayton, O.; Government Relations and Controls, by Dudley V. Walker, Eberhard Mfg. Co., Cleveland; Research, by Mr. Gutenkunst.

The Cost Committee reported that nine clinics were held during the year and that an estimated 30 to 40 per cent of the industry now is using the committee's recommended cost procedures. The Technical Council report indicated that among its future projects would be a study of damping, fatigue and impact values of malleable iron, and establishment of a white iron standard in connection with the National Bureau of Standards.

A detailed report was given on the society's chief research project, the investigation of nodular graphite iron being conducted at the Southern Research Institute, Birmingham, under the direction of Dr. W. H. Austin Jr. Leon J. Wise, Chicago Malleable Castings Co., chairman of the society's steering committee on the project, explained that the actual research work is not sufficiently advanced to present conclusive findings or recommendations on all phases of the subject, but that encouraging progress is being made.

He then introduced James H. Lansing, technical and research director of the society, who gave a resume of known established facts concerning production methods and properties of nodular iron. Mr. Lansing also presented a chart comparing the physical properties of nodular, malleable and pearlitic malleable irons. He expressed the belief that heavy section parts where forgings or weldments commonly are employed might be among the best potential markets for nodular iron castings.

Outlines Research Scope

Dr. Austin outlined the scope of the research project, pointing out that it covers not only the study of improved production practices but also will attempt to determine the probable competitive effect of the new product on malleable iron and how best the malleable iron industry can adapt nodular iron to its own purposes as a production item.

Production details being studied include such factors as magnesium addition methods, inoculants, effect of holding time, annealing, etc. Investigations of the use of standard composition malleable iron as the base metal in production of nodular iron indicate difficulties in thin sections—⅛ to ½ inch—owing to the tendency of low carbon equivalent iron to develop free cementite in such section, Dr. Austin stated.

Commenting on the build-up of residual alloys through reuse of scrap, Dr. Austin indicated this should be no problem with commonly used analyses of either copper-magnesium or nickel-magnesium. With a 70-30 alloy of the former, the maximum build-up would be 1.86 per cent copper, while use of an 80-20 alloy of the latter would result in a maximum nickel content of 3.2 per cent.

W. H. Cantelon, Auto Specialties Mfg. Co., Windsor, Ont., chairman of the Canadian Malleable Institute, members of which became affiliated with the Malleable Founders' Society during the past year, spoke briefly on the industry's activities in Canada.

In his annual report, Lowell D. Ryan, managing director of the society, paid tribute to the work of President Collins Carter and the various committee members whose activities he described as among the most important assets of the organization.

James H. Smith, newly elected president, presided at the closing session, at which proposed programs for each of the society's ten standing committees for the coming year were presented, and a report indicative of the society's sound financial condition was given by Dudley V. Walker, newly elected treasurer.

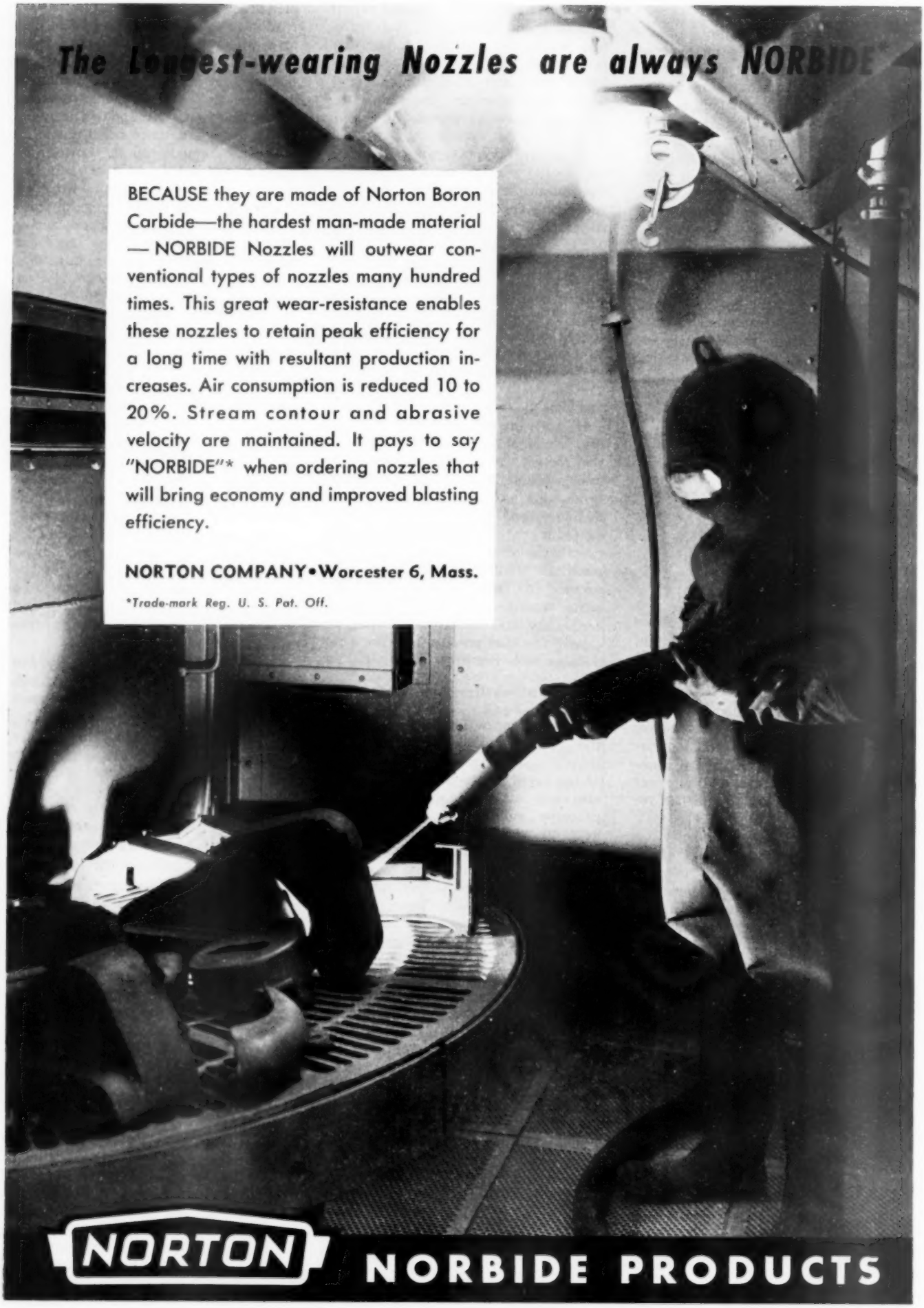
"The Status of Labor Legislation," an unusually detailed discussion of the battle in Congress to repeal or revise the Taft-Hartley Act was presented by Lee Shaw, Seyfarth, Shaw & Fairweather, Chicago. While the outcome of the legislative maneuvers still was very much in doubt at the time of his talk, Mr. Shaw indicated that if any new law is passed, it will incorporate many of the basic features of the existing act.

A busy year for the Publicity and Market Development Committee was reported on by its chairman, Frank O. Parker, Dayton Malleable Iron Co., Dayton, O. Chief among this group's activities has been in connection with the society's motion picture, now completed. In addition to other educational work, Mr. Parker reported that five new display cabinets of malleable iron castings were installed in engineering schools the past year.

Robert E. Belt, retired secretary-treasurer of the society, reported that he is starting preparation of a history of the malleable iron industry in the United States. The work is expected to be completed by the time of the 125th observance of Seth Boyden's discovery of malleable iron in 1826.

Government Orders

Complete and accurate facts about government procurement, showing how manufacturers may get government business, are published in a brochure entitled "United States Government Procurement" written by two editors associated with Trilane Associates—U. S. Government Procurement Service, One Hudson St., New York 13. The brochure is available free of charge.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Proposed Revision of Tentative Recommended Practice for

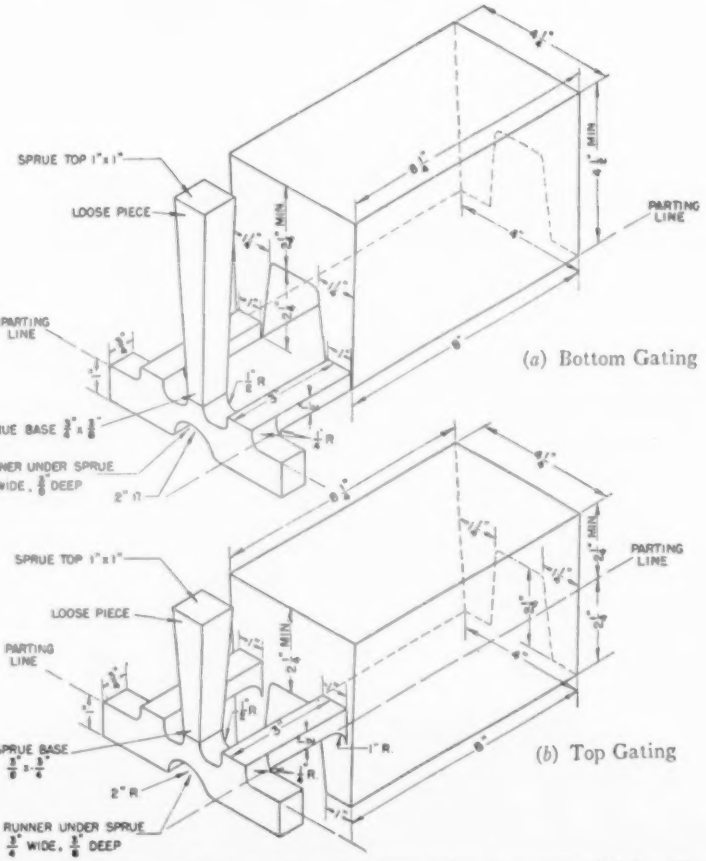
TENSION TEST SPECIMENS FOR COPPER-BASE ALLOYS FOR SAND CASTINGS

ASTM Designation: B 208-49T

Scope

1. (a) This recommended practice outlines the procedure for preparing test coupons and specimens (machined and unmachined) for tension tests of copper-base alloys for sand castings.

(b) The test bar or bars poured in accordance with this recommended practice should be considered as representing the potential properties of the metal going into the castings poured from the same melt, but these proper-

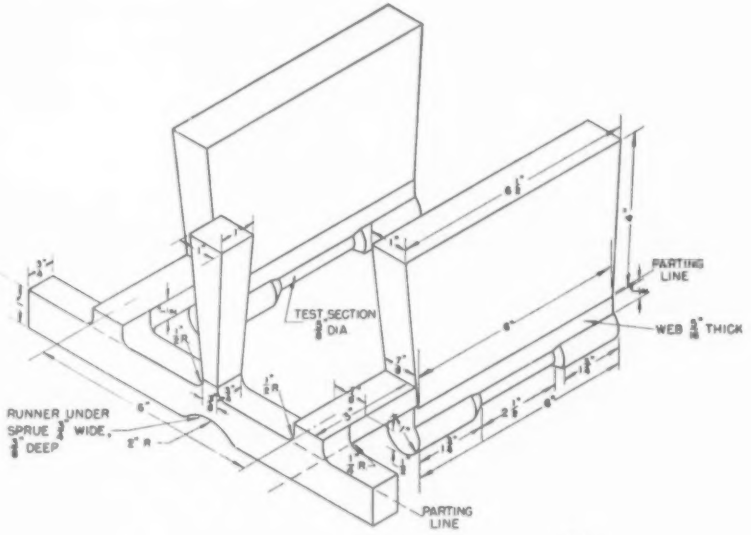


(*a*) Bottom Gating

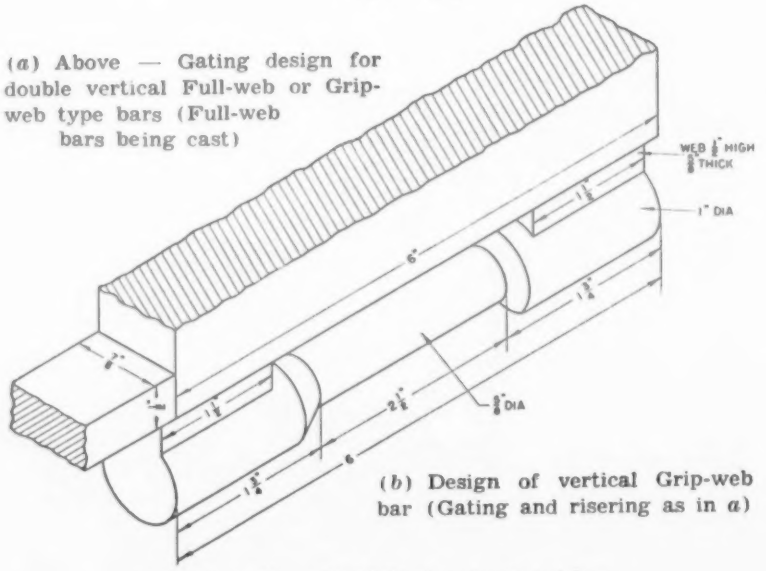
(*b*) Top Gating

Note: Where this type of test bar design is used, bottom gating is recommended for alloys, such as aluminum bronze, where turbulence and oxidation are factors.

Fig. 1—Double keel block test bar



(*a*) Above — Gating design for double vertical Full-web or Grip-web type bars (Full-web bars being cast)



(*b*) Design of vertical Grip-web bar (Gating and risering as in *a*)

Fig. 2—Double vertical full-web and grip test bars

Proposed Revision of Tentative Recommended Practice for

TENSION TEST SPECIMENS FOR COPPER-BASE ALLOYS FOR SAND CASTINGS

ASTM Designation: B 208-49T

ties are not necessarily the same as the corresponding properties of the castings because of the effect of varying size, section and design.

Test Coupons

2. (a) The test bar coupons shall be made in the production sand in which the castings they represent are made. Even if the castings are cast entirely in green sand, partial cores shall be permitted for the test bars but in no case shall chills be permitted.

(b) High-Shrinkage Alloys.—The test specimen coupons for copper-base casting alloys exhibiting high shrinkage during freezing and cooling shall be cast to the form and dimensions shown in Fig. 1. If specimens having

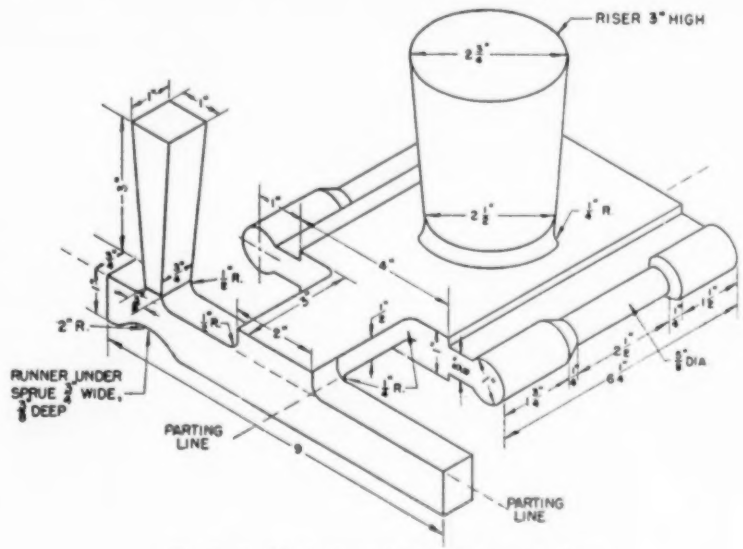


Fig. 3—Double horizontal full-web type test bars

threaded ends are to be used in the tension tests, the length of the blocks may be reduced to 6¼ in.

(c) Low-Shrinkage Alloys.—The test specimen coupons for copper-base casting alloys exhibiting low shrinkage during freezing and cooling shall be cast to the form and dimensions shown in Figs. 2, 3, or 4, as may be prescribed in specifications or agreed to by the manufacturer and the purchaser in the purchase order.

Test Specimens

3. (a) Tension test specimens shall be machined from the coupons described in Sections 2 (b) and (c) and shown in Figs. 1, 2, and 3. They shall be of the form and dimensions shown in Fig. 5.

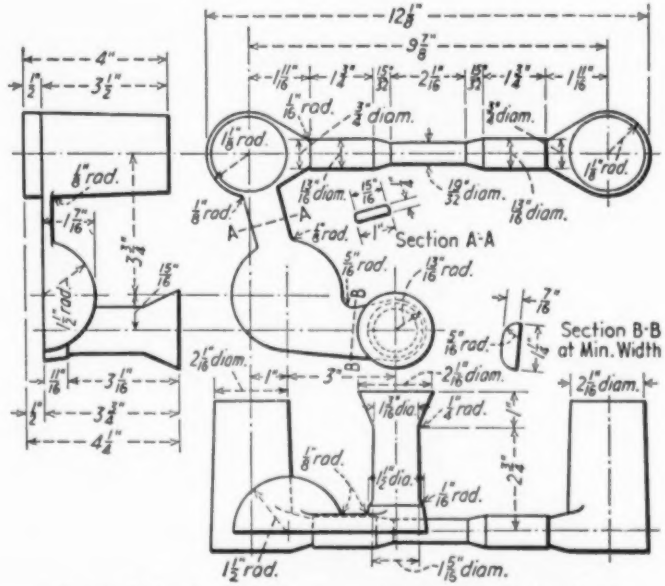
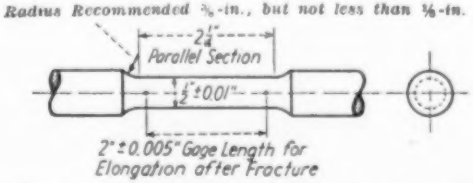


Fig. 4—Optional coupon for as-cast test specimen, button head

(b) In the case of test specimens prepared from the coupons shown in Fig. 4, the manufacturer shall have the option of testing the specimens without machining the gage length; or gage length, parallel section and fillets may be machined to the dimensions shown in Fig. 5.


Minimum Radius Recommended 3/8-in., but not less than 1/8-in. Permitted
2 1/4"
Parallel Section
1/2" ±0.01"
2" ±0.005" Gage Length for Elongation after Fracture

Note: This gage length, parallel section, and fillets shall be as shown, but the ends may be of any shape to fit the holders of the testing machine in such a way that the load shall be axial

Fig. 5—Standard round tension test specimen with 2-in. gage length

Results that add up!

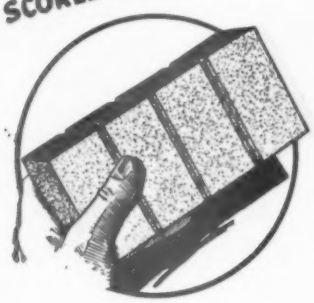
Toss a little Famous Cornell Cupola Flux into cupola with each ton charge of iron and get--

Clean metal
More fluid metal and slag
Sulphur reduction
Sounder castings
Tougher castings
Cleaner castings
Easier machining
Cleaner cupolas

Total

Reduced casting rejects
Reduced cupola maintenance
Better casting deliveries
Increased prestige

Famous CORNELL CUPOLA FLUX
IN SCORED BRICK FORM



Flux in this pre-measured scored brick form reduces, to a few seconds, the time required for cleansing molten iron. No digging out of container. No weighing. No measuring. Simply toss Famous Cornell Flux into cupola with each ton charge of iron or break off one to three briquettes (quarter sections) for smaller charges.

FAMOUS CORNELL FLUXES
Trade Mark Registered

WRITE FOR BULLETIN NO. 46-B

The CLEVELAND FLUX Company
1026-1036 MAIN AVENUE, N.W., CLEVELAND 13, OHIO
Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

ACTIVITIES OF FOUNDRY Groups

Northeastern Ohio

NORTHEASTERN Ohio Chapter of the American Foundrymen's Society held its annual golf outing at Pine Ridge Country Club, Wickliffe, O., June 24. Approximately 235 were present for the dinner held at the club following an afternoon of golf, horseshoe pitching and a softball game between the foundrymen and vendors of foundry supplies.

Low gross golf honors went to Robert Heisler, A. C. Williams Co., Ravenna, O., with a score of 74. The foundrymen won the softball game 19 to 5, defeating the vendors for the second consecutive year.

L. P. Robinson, director of core oil sales, Werner G. Smith Co., Division of Archer-Daniels-Midland Co., Cleveland, was in charge of arrangements for the outing.—*Robert H. Herrmann*

Chesapeake

FINAL meeting of the season was held by Chesapeake Chapter of the AFS, May 19, at the Naval Gun Factory, Navy Yard, Washington, where activities of the modern foundry and pattern shop were observed. The group saw the 25-ton arc furnace tapped and a number of steel castings poured. A side trip was made to the shop where the latest anti-aircraft guns were being assembled and test-fired with compressed air. Dinner was served in the evening at the Dodge Hotel, followed by a technical session, with George K. Dreher, director, Foundry Educational Foundation, Cleveland, as principal speaker.

Mr. Dreher's subject, "Why, What and How of a Graduate Engineer," covered a resume of the history of engineering education with emphasis placed on importance of educating all engineers on the industrial advantages of castings. Foundry education attracts better men into the industry and develops new customers by making the engineers in related industries casting conscious, said the speaker. College training has become a necessary preliminary to entering the field of foundry management.

Officers elected to serve the chapter for the coming year are: J. B. Mentzer, Wood-Embly Brass Co., Waynesboro, Pa., chairman; A. A. Hochrein, Federated Metals Division, American Smelting & Refining Co., Baltimore, vice chairman; C. A. Robeck, Gibson & Kirk Co., Baltimore, secretary-treasurer; William H. Baer, Naval Research Laboratory, Washington, technical secretary. Directors to serve for three years are: Blake M. Loring, Naval Research Laboratory, Washington; T. B. Belfield, Cochrane Foundry Inc., York Pa.; and C. D. Galloway, Chambersburg Engineering Co., Chambersburg, Pa. —*Jack H. Schaum, National Bureau of Standards.*

Central Illinois

THIRD annual clambake of Central Illinois Chapter of the AFS was held June 11 at the 40/8 Chateau, near Pekin, Ill. Approximately 275 members and guests enjoyed the afternoon playing golf, watching an excellent exhibition of fly and bait casting by "Wally" Walz, and a good Labrador retriever dog act by Clarence Steube.

At 5:30 p.m. dinner was served and the guests had their fill of clams, chicken and all the trimmings. W. G. Schuller, general chairman, is to be commended for the complete success of this stag outing. — *V. W. Swango, Caterpillar Tractor Co.*

Tennessee

AT THE May 27 meeting of Tennessee Chapter of the AFS, held at Hotel Patten, Chattanooga, Tenn., prizes were awarded to winners of a quiz contest on casting defects

(*Continued on page* 140)

NORTHEASTERN OHIO Chapter of the AFS celebrated old timers' and past presidents' night May 12 at Tudor Arms Hotel, Cleveland. Above left, D. V. Walker, general manager, Eberhard Mfg. Co., Cleveland, awards plaque to Gustav H. Zimmerman who is still active at Eberhard after 67 years of foundry service. At center, F. Ray Fleig, Smith Facing & Supply Co., Cleveland, (left) congratulates Walter Sicha, Aluminum Co. of America, Cleveland, and retiring chapter chairman. At right a group of old timers at Aluminum Co. of America is shown with Mr. Sicha. Photos by courtesy of Aluminum Co. of America

Consider these savings

MOGUL® Cereal Binder puts money in your pocket in these three ways:

SAVES TIME...
dries quicker

IMPROVES QUALITY
...yields smooth cores

AVOIDS WASTE...
reduces discards

Ask, without obligation, our Technical Sales Department for full technical service in the profitable use of *MOGUL Cereal Binder.*

CORN PRODUCTS REFINING COMPANY

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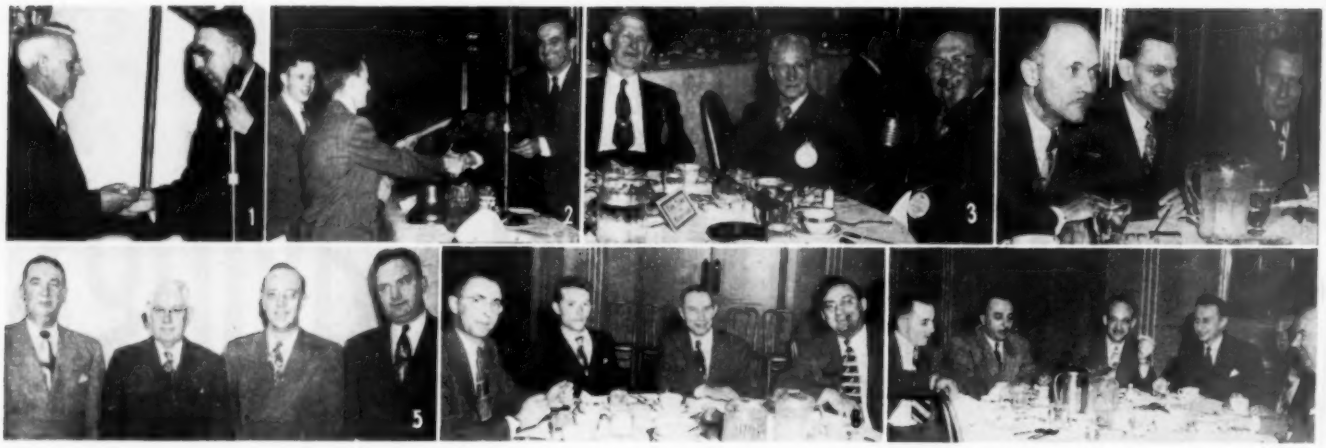

WISCONSIN Chapter of the AFS held its old timers and apprentice meeting May 13 at Hotel Schroeder, Milwaukee. Fig. 1 shows D. C. Zuege, Sivyer Steel Casting Co., Milwaukee, presenting a ring to Robert W. Woodward, Bucyrus-Erie Co., South Milwaukee, in recognition of his service to the chapter. Fig. 2—Andrew Baltoni presents apprentice award to Victor Radloff, Brillion Iron Works Inc., Brillion, Wis. Fig. 3—Group of old timers. Fig. 4—Left to right, C. Furst, C. P. Katowicz and Walter Gerlinger. Fig. 5—Newly elected officers, left to right, are: George Tisdale, Zenith Foundry Co., secretary; Mr. Woodward, re-elected president; Walter Edens, Badger Brass & Aluminum Co., vice president, and Leon Decker, Allis-Chalmers Mfg. Co., treasurer, all of Milwaukee. Fig. 6—Left to right, D. Dobson, John Back, William Lesh and E. Christianson. Fig. 7—Left to right, James Murphy, Charles Perino, Robert Gussor, Joseph Reters, Anthony Herrmann and Jack Skelly. Photos by W. V. Napp, Badger Firebrick & Supply Co., Milwaukee

(*Continued from page* 138)

First prize, consisting of rod and reel, went to C. C. Wilson, Enterprise Wheel & Car Co., Bristol, Va. Second prize, a picnic kit, was given to Tom Alford, Wheland Co., Chattanooga. Paul Arnold, U. S. Pipe & Foundry Co., Chattanooga, who tied for second prize, received tickets to the barbecue to be held Aug. 27 at Signal Mountain Golf and Country Club. Third and fourth prize winners who also received barbecue tickets were: Sam Northington, Combustion Engineering Co.; J. D. Cliett, Crane Co.; Albert Waller, Ross-Meehan Foundries Inc.; and H. U. Huff, Wheland Co., all of Chattanooga.

Officers and directors to serve for the coming year were announced as follows: Chairman, Karl Landgrebe, Wheland Co.; vice chairman, P. A. Arnold, U. S. Pipe & Foundry Co.; secretary-treasurer, Herman Bohr, Robbins & Bohr, all of Chattanooga. Directors for three-year terms are: Sam Northington, Combustion Engineering Co.; and Lester Bealer, American Brake Shoe Co., Chattanooga. For two-year terms: Charles Saunders, Tennessee Products & Chemical Corp., Nashville; and D. B. Shannon, Somerville Iron Works,

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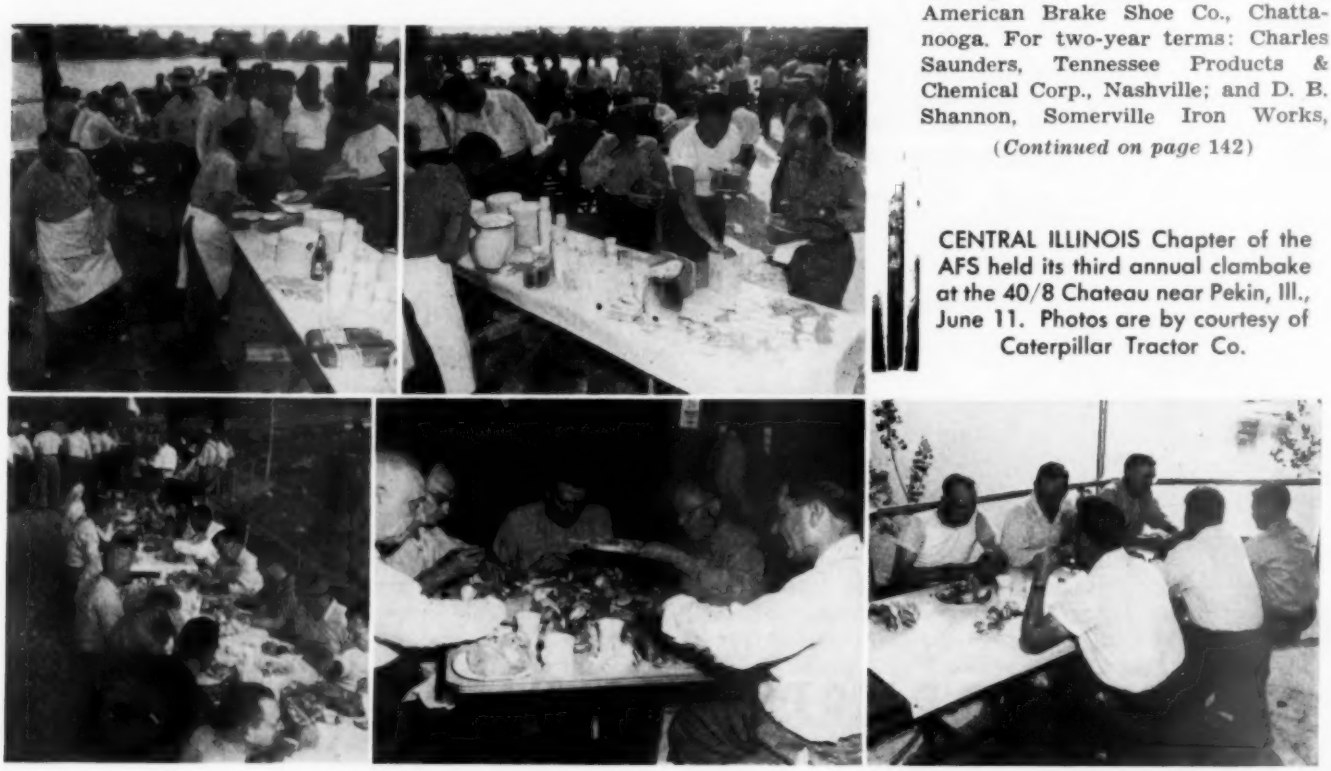

CENTRAL ILLINOIS Chapter of the AFS held its third annual clambake at the 40/8 Chateau near Pekin, Ill., June 11. Photos are by courtesy of Caterpillar Tractor Co.

to Wheelabrator® Users

and users of any other blast cleaning equipment

You've Needed Better Shot

NOW IT'S HERE!

TRU-STEEL SHOT

THE ONLY PERFECTED TRUE STEEL SHOT

Gives you top performance and economy because of these

EXCLUSIVE FEATURES

ROUND AND SOLID

•

HARD AND TOUGH

FULLY HEAT TREATED

•

WEARS DOWN DOES NOT BREAK DOWN

•

ACCURATELY GRADED

A higher quality and longer life blast cleaning shot has been needed for a long time. Recognizing this, *American* actively devoted its energies over the past several years to developing a simple means for making shot and in producing it in tough steel instead of chilled iron.

Our work resulted in a process that has been licensed to the Steel Shot Producers, Inc., of Butler, Pa., one of the affiliates of the Pittsburgh Crushed Steel Co.—largest producer for many years of shot and grit, whose experience background has enabled them to provide producing facilities and "know-how" in shot making, heat-treatment, size screening, etc.

The product, known as TRU-STEEL, is now being produced in the Butler, Pa. plant, and *American* is acting as sales agent because of our interest in supplying Wheelabrator users with the best quality and most economical material for blast cleaning.

TRU-STEEL is a genuine true steel that has received a full heat treatment, not just a draw or anneal. It is accurately controlled as to quality and hardness.

We strongly recommend an early trial of TRU-STEEL because of the important economies it provides. Here are typical examples of performance:

Case A* On a heat treat descaling job only 2.73 lbs. of TRU-STEEL shot per wheel hour were used in 476 wheel hours. During this time no wheel parts, such as blades, control cages or impellers, were replaced.

Case B* A reduction from 15 lbs. of chilled iron shot per wheel hour to 1.5 lbs. of TRU-STEEL shot was effected in cleaning gray iron castings.

Case C* In a shot peening operation only 15.66 lbs. of TRU-STEEL shot per wheel hour was needed compared with 79.99 lbs. of chilled iron shot.

*Name upon request.

Performance Characteristics of TRU-STEEL SHOT

1. Cleans at least as fast as chilled iron shot.
2. Less machine maintenance required . . . . wearable parts last longer.
3. Useful life many times longer than chilled iron . . . less to buy, store, and transport.
4. Lower cleaning cost per ton.

Immediate Delivery All Sizes

Get the Facts

TRU-STEEL has no equal for economy and performance. It is new and different from any competitive product.

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☐ Please mail me complete information about TRU-STEEL Shot.

☐ Would like to discuss with representative.

Name _____ Title _____

Company _____

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WHEELABRATOR & EQUIPMENT CORP.

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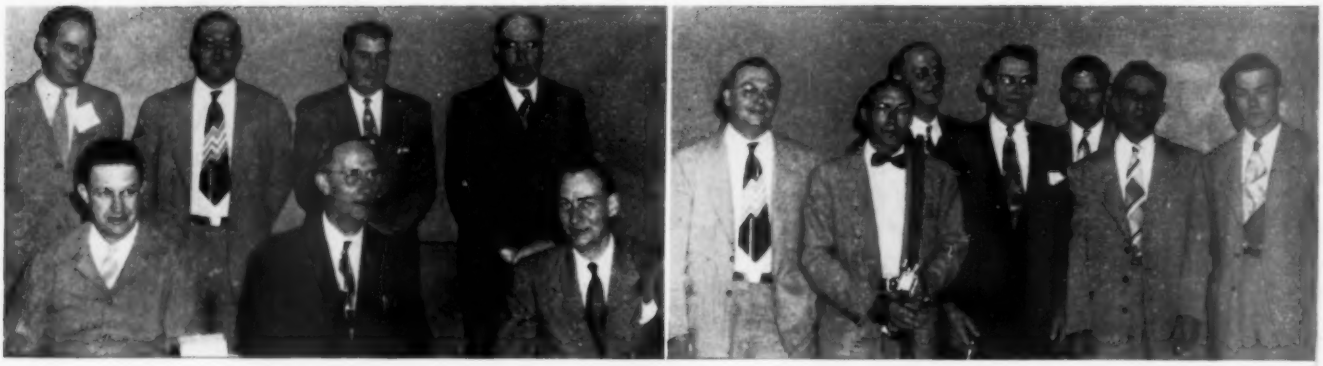

TENNESSEE Chapter of the AFS elected officers and directors May 27 at Hotel Patten, Chattanooga, Tenn. They are shown in photo at left. Front row, left to right, are: Herman Bohr, Robbins & Bohr Co., secretary-treasurer; Paul Arnold, U. S. Pipe & Foundry Co., vice chairman, and Karl Landgrebe, Wheland Co., chairman, all of Chattanooga. Back row, left to right, are directors: Porter Warner Jr., Porter Warner Co.; Sam Northington, Combustion Engineering Co.; Lester Bealer, American Brake Shoe Co., and W. P. Delaney, Eureka Foundry Co., all of Chattanooga. Winners in a chapter sponsored quiz contest are shown at right: Left to right are: Mr. Northington; C. C. Wilson, Enterprise Wheel & Car Co.; Mr. Arnold; H. U. Huff, Wheland Co.; J. D. Cliett, Crane Co.; Tom Alford, Wheland Co., and Albert Waller, Ross-Meehan Foundries Inc.

(*Continued from page* 140)

Chattanooga. For one-year; W. P. Delaney, Eureka Foundry Co., Chattanooga; Porter Warner Jr., Porter Warner Co.; G. Frank Anderson, Chattanooga Implement & Mfg. Co., Chattanooga; and William Willson, Athens Plow Co., Athens, Tenn.—*Carl A. Fischer Jr., Fischer Supply Co.*

Northwestern Pennsylvania

FINAL meeting of the season was held by the Northwestern Pennsylvania Chapter of the AFS, June 27, at the Moose Club, Erie, Pa. A. Allen Sulcowe, a member of the Philadelphia bar, and state director of the Pennsylvania State Employment Service, discussed "Employment in Pennsylvania Foundries."

Officers elected by the chapter to serve for the year 1949-50, include the following: Chairman, Joseph A. Shuffstall, National Erie Corp.; vice chairman, Frank P. Volgstadt, Griswold Mfg. Corp.; treasurer, Fred J. Carlson, Weil-McLain Co.; secretary, Earl Strick, Erie Malleable Iron Co., all of Erie, Pa.

New directors with terms expiring in 1952 are: Charles Gettschalk, Cascade Foundry Co.; William Piper, Erie Bronze Co., of Erie; C. C. Hahn, National Transit Co., Oil City, Pa. Roy Loder, Erie Malleable Iron Co., Erie, was elected to fill the unexpired term of Fred Carlson, newly elected treasurer.—*James J. Farina, American Sterilizer Co.*

Central New York

CENTRAL New York Chapter of the AFS held its annual outing and business meeting at Mountain Top Grove, Binghamton, N. Y., June 10. Hosts to about 115 members and guests who attended were G. C. Ford, Fairbanks Co., Binghamton, N. Y.; E. Kime and A. Hall, Hallstead Iron Foundry Co., Hallstead, Pa.; Mrs. Louise Sacrey, Frank L. Phillips Co., Binghamton, N. Y.; and M. H. Steele, Sweets Foundry Co., Johnston City,

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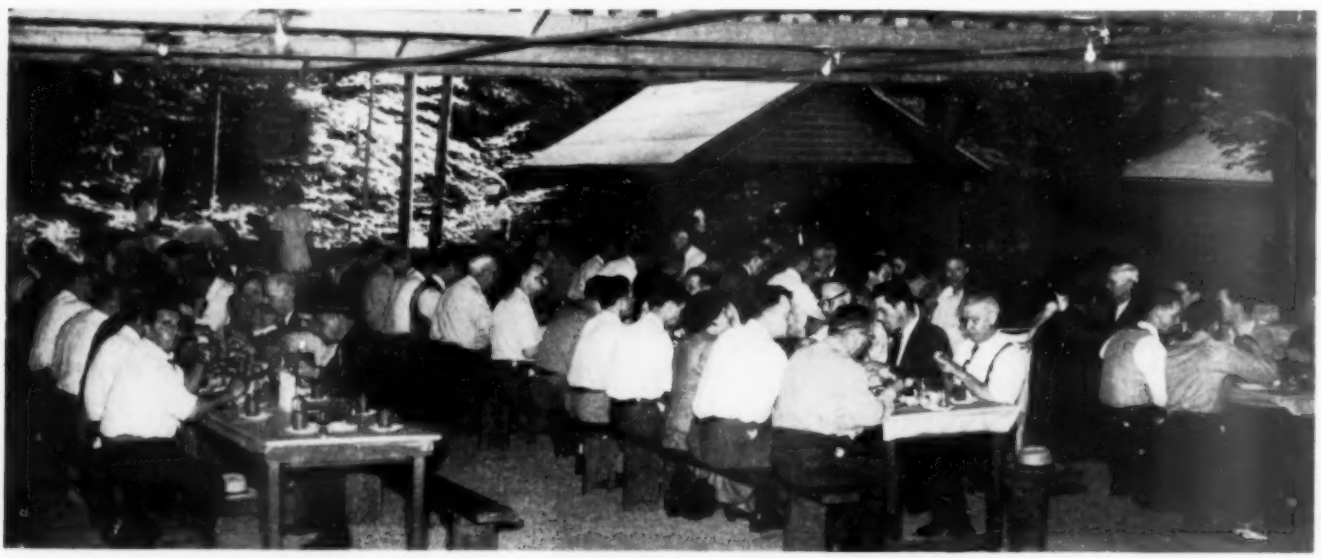
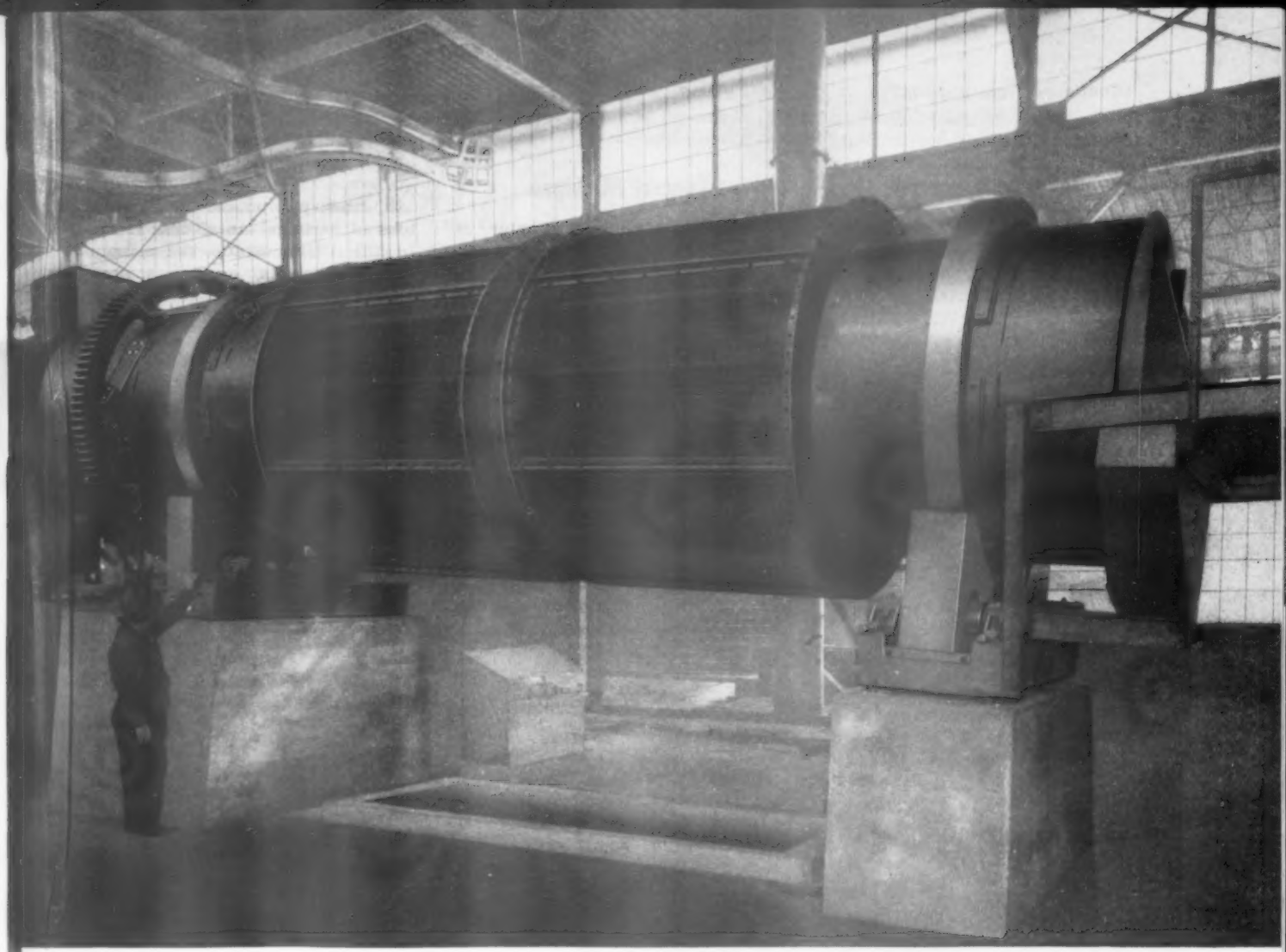


CENTRAL NEW YORK Chapter of the AFS held its annual business meeting and outing at Mountain Top Grove, Binghamton, N. Y., June 10



It cools and screens hot shakeout sand

THE Bartlett-Snow Rotary Sand Cooling Screen pictured above (with dust hood and collecting hopper removed) handles about 135 tons per hour of hot shakeout and returned spill sand, in a large grey iron production foundry, reducing sand temperatures 25° to 50°F. preliminary to storing and mulling. The shell is 72″ in dia. by 28′ long, trunnion mounted, double jacketed and girt gear driven.

Incoming sand passing into the 10 foot breaker section is raised and dropped by lifting flights, breaking up the core lumps so effectively that little waste sand passes through to the tote box.

The fines pass through two double jacketed screening sections, each 6′ long, and discharge into a collecting hopper feeding to a belt conveyor. The dust hood is so mounted over the screen that air can be drawn in from the sides as well as through the ends of the screen, assuring dust-free operation and efficient cooling.

This screen is only one unit in a complex foundry completely engineered and installed by Bartlett-Snow . . . with molding, pouring, shakeout and cleaning operations synchronized so accurately that metal from the cupola is loaded into freight cars as inspected casting 1¼ hours after pouring.

Let the Bartlett-Snow foundry experts with their intimate familiarity with the needs of practical day after day foundry operation,—work with you on your next sand, mold, or castings handling problem. The C. O. Bartlett & Snow Company, 6200 Harvard Avenue, Cleveland 5, Ohio. Engineering representatives in New York, Baltimore, Detroit and Chicago.

BARTLETT-SNOW
CLEVELAND 5, OHIO

DESIGNING AND CONTRACTING ENGINEERS

For the Foundry Industry

SAND, MOLD AND CASTINGS HANDLING EQUIPMENT

(*Continued from page* 142)

N. Y. The day's program consisted of a buffet luncheon, refreshments and sports in the afternoon, and a business meeting followed by a clambake dinner.

Officers elected for the coming year are: J. F. Livingston, Crouse-Hinds Co., Syracuse, chairman; D. Dudgeon, Utica Radiator Corp., Utica, vice chairman; W. D. Dunn, Oberdorfer Foundries, Syracuse, secretary; and D. J. Merwin, Oriskany Malleable Iron Co., Oriskany, New York, treasurer.

Directors elected for three-year terms are: H. Boardman, General Electric Co., Elmira; C. M. Fletcher, Fairbanks Co., Binghamton; and J. O. Ochsner, Crouse-Hinds Co., Syracuse. The following were appointed as chairmen of various committees: P. E. Kyle, Cornell University, Ithaca, educational; W. A. Mader, Oberdorfer Foundries, Syracuse, nonferrous; and J. A. Feola, Crouse-Hinds Co., Syracuse, publicity.—*John A. Feola, Crouse-Hinds Co.*

Central Michigan

CENTRAL Michigan Chapter of the AFS held its May 17 meeting at the American Legion Clubhouse, Battle Creek, Mich., with Prof. Charles C. Sigerfoos, chapter chairman, presiding and Dr. Austen J. Smith, professor at Michigan State College, acting as technical chairman. Frank G. Steinebach, editor, THE FOUNDRY, addressed the group on the "Future of the Foundry Industry."

Mr. Steinebach paid tribute to the work of the Central Michigan Chapter and to the contributions of all chapters to the growth and development of the American Foundrymen's Society. He made the suggestion that chapters should become the clearing house for data developed by various committees of the society.

The speaker emphasized the importance of the foundry industry as a producer of basic engineering materials. He pointed out that in 1948 the industry produced 16½ million tons of castings—an all-time record. In the United States the industry has 5452 plants, employs approximately 400,000 men and women and produces components valued at around 5 billion dollars.

An important development of the postwar period has been the movement toward modernization and mechanization of foundries. Mechanical handling of materials has supplanted hand methods wherever possible and new machines and methods have been developed to improve production and provide better working conditions.

Since October the industry has experienced a decline in orders. Backlogs have been wiped out, resulting in reduced operating schedules. The speaker ventured the opinion that since pipelines for consumer goods have been filled cost reductions are necessary if markets are to be enlarged. Future demands will probably stabilize at a lower plateau and much depends on the industry's ability to improve its product and reduce costs. To this end he emphasized the importance of eliminating production waste, improving practice through quality control, using results of research, further modernization and mechanization, developing a pride in workmanship on the part of employees, and selling the foundry industry to the community.

In conclusion Mr. Steinebach urged foundrymen to make the best castings possible, and to avail themselves of technical information on modern practices to improve the job. He predicted a bright future for the industry and indicated that castings will continue to be the basic materials of engineering construction.—*Arthur J. Stone*

CENTRAL INDIANA Chapter of the AFS met at the Athenaeum, Indianapolis, May 23. Principal speaker (left) was Clyde A. Sanders, American Colloid Co., Chicago. Three past chairmen (below) were honored at the meeting. Left to right, they are: William B. Ziegelmueller, Raymond S. Davis and H. H. Lurie. New officers, shown in bottom view, are, left to right: Jack W. Giddens, vice chairman; S. F. Swain, chairman; Robert Langsenkamp, retiring chairman; Ray Fickenworth, treasurer, and Paul Faulk, secretary

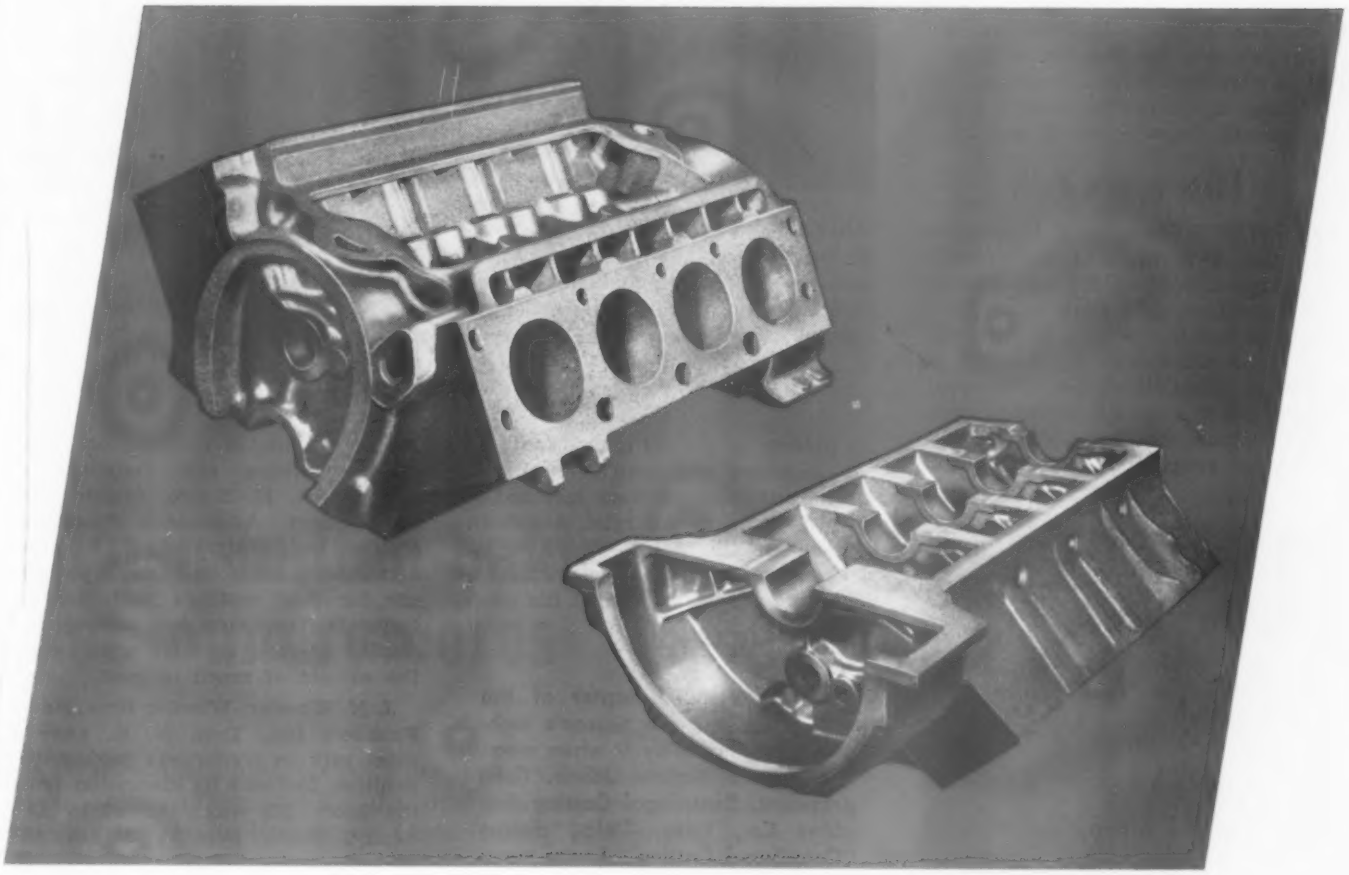
Central Indiana

JUNE 13 meeting of Central Indiana Chapter of the AFS was held at the Athenaeum, Indianapolis, with S. F. Swain, Golden Foundry Co., Columbus, Ind., the new chairman, presiding, after formally accepting the post from Robert Langsenkamp, Langsenkamp-Wheeler Brass Works, Indianapolis, retiring chairman.

Jack W. Giddens, International Harvester Co., Indianapolis, vice chairman for the coming year, reported on progress made toward a speakers' program for the next season. Allen Reid, Indianapolis, was

(*Continued on page* 146)

Another Engineering Achievement by BUFFALO PATTERN WORKS



These New Motor Blocks Are Made With High Accuracy Buffalo Pattern Works Equipment

Buffalo Pattern Works recently completed several duplicate sets of machined, high-speed production equipment to produce this late model cylinder block with a low scrap ratio and low machining cost. This brand of skill has been the hallmark of Buffalo Pattern Works for over 56 years.

We invite you to consult us regarding your production pattern requirements.

Since 1893

BUFFALO PATTERN WORKS

830 HERTEL AVE. BUFFALO, N. Y. RI. 3512

(*Continued from page* 144)

renamed membership chairman and W. K. Mitchell, L. W. & W. K. Mitchell Co., Indianapolis, was again named chapter reporter. Robert Spurgin, Swayne-Robinson & Co., Richmond, Ind., will assist Mr. Mitchell. Plans for a sustained membership drive were outlined for the fall, and arrangements for the annual picnic of the chapter, to be held in September, were discussed. A meeting of the chapter directors will be held in August.—*W. K. Mitchell*

Eastern New York

EASTERN New York Chapter of the AFS featured a "Problem Castings Clinic" at its last meeting of the season, held June 21 at Circle Inn, Latham's Corners, on the outskirts of Albany, N. Y. Kenneth F. Echard, Eddy Valve Co., Waterford, N. Y., newly-elected chairman, presided. This was not a "Stump the Experts" program, but a chance for all present to discuss individual casting problems and both ferrous and nonferrous castings were included.

J. M. Jones, metallurgist, American Locomotive Co., Schenectady, N. Y., presented a film showing production and testing of gray iron at his company. Discussion followed on operating problems and metallurgical control. G. E. Moore, foundry superintendent, Adirondack Foundries & Steel Inc., Watervliet, N. Y., gave a talk with slides on foundry procedure for steel castings made for D-Day. His company had arranged a display of steel castings which were the subject of much interest.

J. N. Wheeler, Wheeler Bros. Brass Founders Inc., Troy, N. Y., gave a short talk on nonferrous casting difficulties, followed by discussion from the floor. He was followed by Leo Scully, Scully Foundry & Machine Co., Coxsackie, N. Y., who related some difficulties he had encountered in the nonferrous casting field.

A group of professors from other colleges visiting Rensselaer Polytechnic Institute attended the meeting. The group included: C. C. Sigerfoos, associate professor of mechanical engineering, Michigan State College and president of Central Michigan Chapter of the AFS; Allison Butts, professor of metallurgy, Lehigh University; and Austen J. Smith, head professor of metallurgical engineering, Michigan State College.—*George Danner, American Locomotive Co.*

NATIONAL FOUNDRY ASSOCIATION held a foundry management meeting at the Antlers Hotel, Indianapolis, June 16. Robert Langsenkamp (right, a speakers' table), Langsenkamp-Wheeler Brass Works Inc., Indianapolis, presided. Leroy E. Roark (left, at speakers' table), executive vice president of the association, discussed association legislative activities and told of plans to initiate an educational program to improve labor-management relations

CENTRAL OHIO Chapter of the AFS concluded the season's technical meetings May 9 when members heard Nathan Janco, (left) president, Centrifugal Casting Machine Co., Tulsa, Okla., discuss "Centrifugal Casting." Lower views show sections of the speakers' table. Photos are by W. H. White, Jackson Iron & Steel Co.

Western New York

APPROXIMATELY 130 members and guests attended the May 13 dinner meeting of the Western New York Chapter of the AFS, held at Hotel Sheraton, Buffalo. Norman J. Dunbeck, Eastern Clay Products Inc., Jackson, O., a national director of the society, addressed the group.

Officers elected to serve the chapter for the year 1949-50 include: John R. Wark, Queen City Sand &

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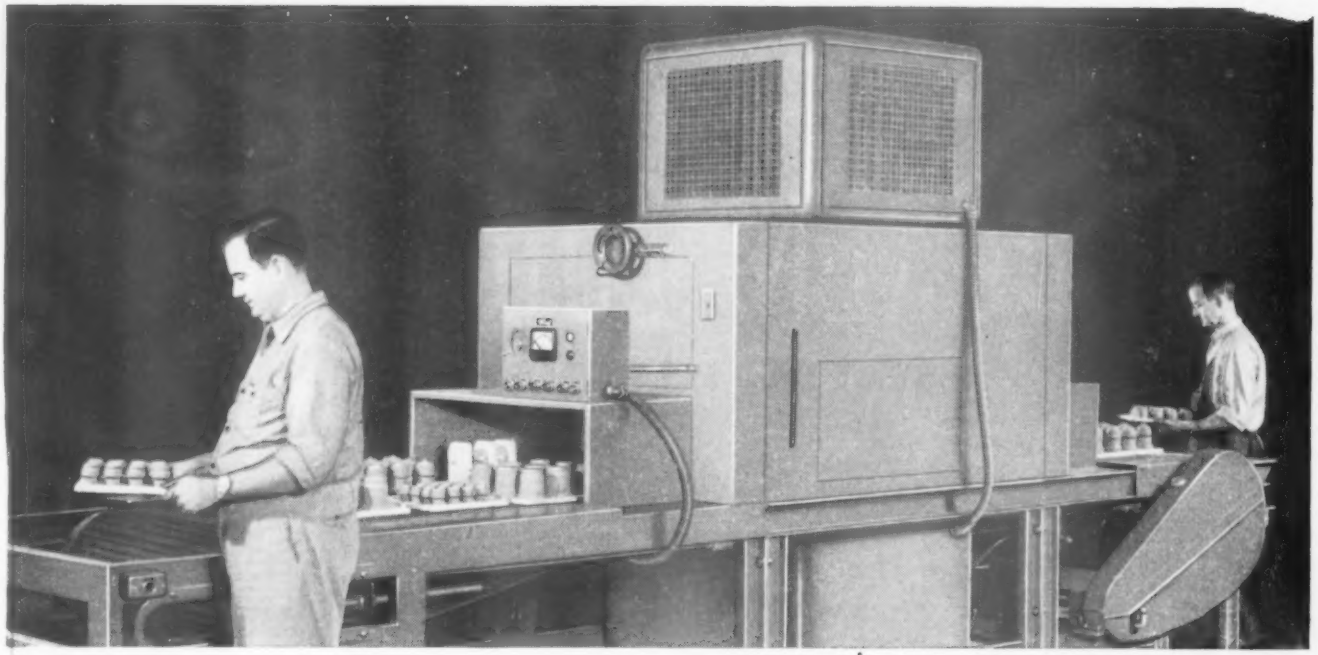


Push-button baking of foundry cores

NOW you can have straight line, conveyorized, continuous core baking in a compact unit designed to save space, time, and labor!

Thermex High Frequency Core Baking Equipment produces superior foundry cores in a matter of minutes . . . cores that possess greatly improved shakeout and collapsibility characteristics.

With Thermex Core Baking Equipment, you'll save thousands of dollars annually in labor costs alone. The capacity of your mulling equipment is doubled. Far fewer mixes are required to produce a variety of cores. The labor involved in removing and re-racking core plates is eliminated . . . the cores go directly to the inspection table from your Thermex Core Baking Equipment. The cores themselves have no burned or broken surfaces to cause ridges, pits, or fins that must be removed from the castings.

How's that for saving costly man-hours that add up to cold, hard cash?

You'll want the complete, fact-filled story contained in our folder, "Thermex High Frequency Core Baking Equipment". It's interesting and it's important . . . to you. Send for your copy today!

Thermex

T. M. Reg. U. S. Pat. Off.

HIGH FREQUENCY CORE BAKING EQUIPMENT

The Girdler Corporation, Thermex Division

Louisville 1, Kentucky

FACTS about Thermex Core Baking Equipment

INSTALLED COST

Usually less than conventional ovens. Equipment—*complete with conveyor*—is simply placed in position and connected to power line.

OPERATING COST

Power is used only when cores are being baked and in proportion to the type and quantity. No power or time is lost in starting or in shutting down production.

MAINTENANCE COST

Negligible, because operation is remarkably simple. Only moving parts are the conveyor and exhaust blower. Push-button controls.

BINDER COST

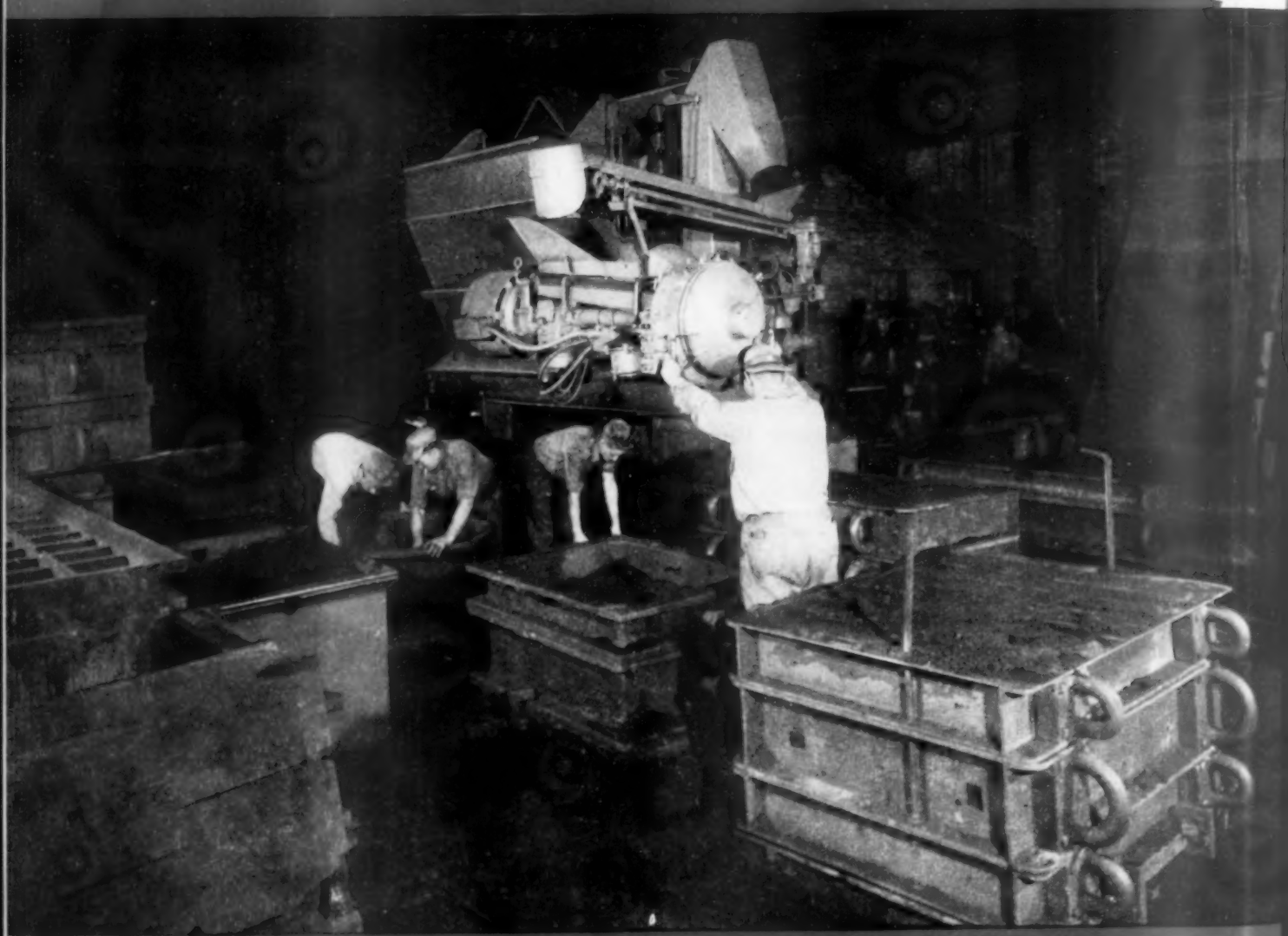
Actually no more than the cheaper oil binders, because only one-third to one-half as much synthetic resin binder is required. A wide variety of proved resin binders is now available

CASTING CLEANING COST

The labor normally required for correction of defects such as blow holes, pits, etc., in the casting is reduced to a minimum.

LINDGREN FOUNDRY CHOE

BATAVIA, ILLINOIS



Lindgren's Motive Jr. Sandslinger rams a large variety of mo
on both sides of its 160 foot long track in the heavy castings b

E SANDSLINGER

PREPARATOR and SCREENARATOR

The Sandslinger-Preparator-Screenarator combination has proved to be the most modern method for increased production and higher quality, truer to pattern castings at the Lindgren Foundry Company, Batavia, Illinois.

Lindgren's Motive Jr. Sandslinger has reduced molding time 30% on large side frame and machine bed casting molds and, in addition, as a "spare time" operation, this Sandslinger rams all of the smaller molds on Lindgren's loop conveyor unit.

The Preparator completely conditions all of the sand for the Motive Jr. Sandslinger. A Screenarator thoroughly prepares all of the sand for side floors and bench molding. B&P "Better Methods" will help you too.

Write today for complete information!

Every night the portable Preparator completely conditions all of the shakeout sand required by the Motive Jr. Sandslinger for the next day's operation.

The Motive Jr. Sandslinger also rams all of the smaller size molds on Lindgren's loop conveyor unit as a "spare time" operation. Such versatility means lower molding costs to any jobbing foundry.

Lindgren's Screenarator thoroughly prepares all sand for the side floor and bench molding departments. It economically screens, aerates, blends and then piles the sand where needed.

BEARDSLEY & PIPER

Division of

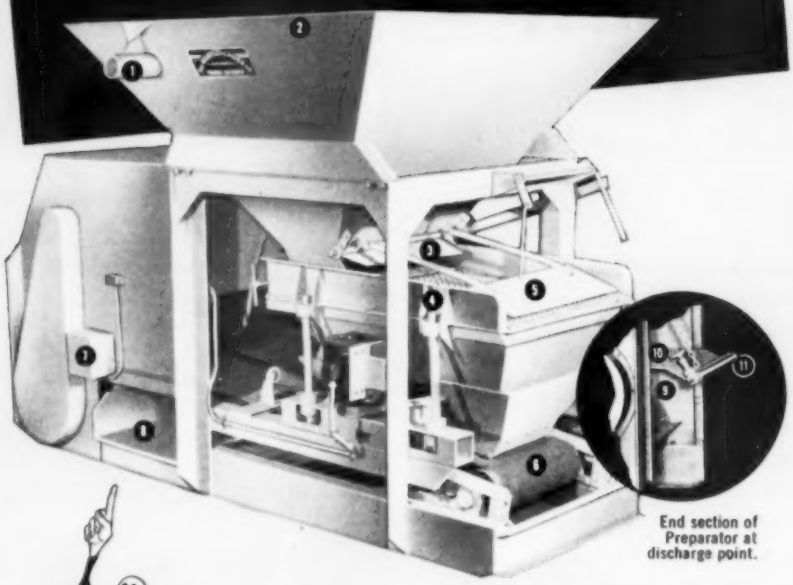
PETTIBONE MULLIKEN CORPORATION

2424 North Cicero Avenue, Chicago 39, Illinois

Beardsley & Piper are manufacturers of the Sandslinger • Speed-slinger • Hydra-Slinger • Speedmuller • Mulbaro • Screenarator Nite-Gang • Junior Nite-Gang • Preparator • Champion Speed-Draw • Plate Feeders • Turntables • Gyratory Screens

COMPLETE SAND CONDITIONING WITH MAGNETIC SEPARATION

in one portable unit



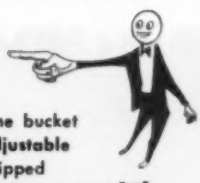
End section of Preparator at discharge point.

Here tramp iron is discharged from machine into scrap box . . . an exclusive Preparator feature.

Newly designed and streamlined, the Preparator provides your foundry with an efficient, dependable, heavy duty, portable sand conditioner. This one machine screens, breaks lumps, magnetically separates, aerates and discharges sand up to 35 feet into pile or bin. Load centered trunnions permit easy movement by crane. Rugged construction assures years of service, even with the roughest of treatment. Completely conditions up to sixty tons of sand per hour!

the PREPARATOR

HOW IT OPERATES



Preparator easily lifted by Trunnions [1]—and moved to any desired location by crane. Shakeout sand is loaded by crane bucket or loader into large open top hopper [2] and feeds through adjustable gate opening [3] onto heavy duty Gyratory Screen [4] equipped with adjustable lump breaker [5]. Screened sand drops onto belt conveyor [6] and passes over magnetic pulley [7] which separates tramp iron into scrap box [8]. The cleaned sand falls onto drum type aerator [9] which discharges it to any distance up to thirty-five feet. The adjustable deflector plate [10] controls the distance the sand is thrown. The water spray [11] at discharge point, provides final tempering.

MAIL THIS COUPON

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Division of Pettibone Mulliken Corporation
2424 North Cicero Avenue, Chicago 39, Illinois

☐ Send Preparator Bulletin
☐ Have B&P Representative Call

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Beardsley & Piper are manufacturers of the Sandslinger . Speedslinger . Hydra-Slinger . Speedmuller . Mulbaro . Screenarator . Nite-Gang . Junior Nite-Gang . Preparator . Champion Speed-Draw . Plate Feeders . Turntables . Gyratory Screens

(*Concluded from page* 146)

Supply Co., Buffalo, chairman; Albert A. Diebold, Atlas Steel Castings Co., Buffalo, vice chairman; Roger E. Walsh, Hickman, Williams & Co., Buffalo, secretary; and Martin W. Pohlman, Pohlman Foundry Co., Buffalo, treasurer.

Directors elected to serve 3-year terms are: Robert Young, Lumen Bearing Co.; Robert A. Bruce, Buflovak Equipment Division, Blaw-Knox Co.; and A. J. Heysel, E. J. Woodison Co., all of Buffalo.

Cleveland Non-Ferrous

EIGHTEEN members and guests were present at the May 28 meeting of the Cleveland Chapter of the Non-Ferrous Founders' Society held at the Cleveland Athletic Club. Dr. R. T. Maneely, Hoffman Bronze & Aluminum Co., Cleveland, chapter chairman, presided.

A. M. Thurston, chief engineer, East Ohio Gas Co., Cleveland, was guest speaker and discussed the merits of various gas burners, comparing costs of use of gas and oil for melting metals.

Annual golf party of the chapter was held at Boston Hills Country Club, June 17.—*Robert J. Brennan, Royal Brass Mfg. Co.*

Book Review

History of the Tools Division, War Production Board, by Bradley Stoughton, cloth, 154 pages, published by the McGraw-Hill Book Co., New York.

This is a story of a great co-operative effort which permitted the machine tool and allied industries to be first in line in preparedness, and to perform maximum service to the nation throughout the war emergency. The story starts with the organization of the Advisory Commission to the Council of National Defense, and the appointment of the Machine Tools and Heavy Ordnance Division under Mason Britton, the late A. B. Einig, Donald Laflin and Howard Dunbar, and it carries on through the Office of Production Management, and the War Production Board.

It tells of the development of pool orders, a mechanism established to permit manufacturers to produce at maximum capacity, the organization of industry advisory committees, the use of allocations, diversion and substitution to distribute tools to points of greatest need, and finally the application of priorities. And it discusses in some detail the organization of the various branches and units, including machine tools proper, the Gages and Machinists' Precision

Measuring Tools Section, the Cranes and Hoists Section, the Heat Treating Equipment Section, the Foundry Equipment and Supplies Section, including metal melting furnaces, the Abrasive Products Section, and others.

The machine tool and allied industries, and the men and women who were connected at some time with the Tools Division, owe Bradley Stoughton, the author of this story, a deep debt of gratitude for his painstaking work in assembling the data presented in this book. Of all of those connected with the division, Dr. Stoughton was probably best qualified to undertake this work. He is an educator, an author, and possesses an intimate knowledge of the metal working industry. He joined the division on Feb. 13, 1941, as chief of the Heat Treating Equipment Section, and served in that capacity until July 3, 1945. From Feb. 3, 1944, he also was acting chief, Foundry Equipment and Supplies Section. He knew most of the men he writes about, and was familiar with the various events as they transpired.

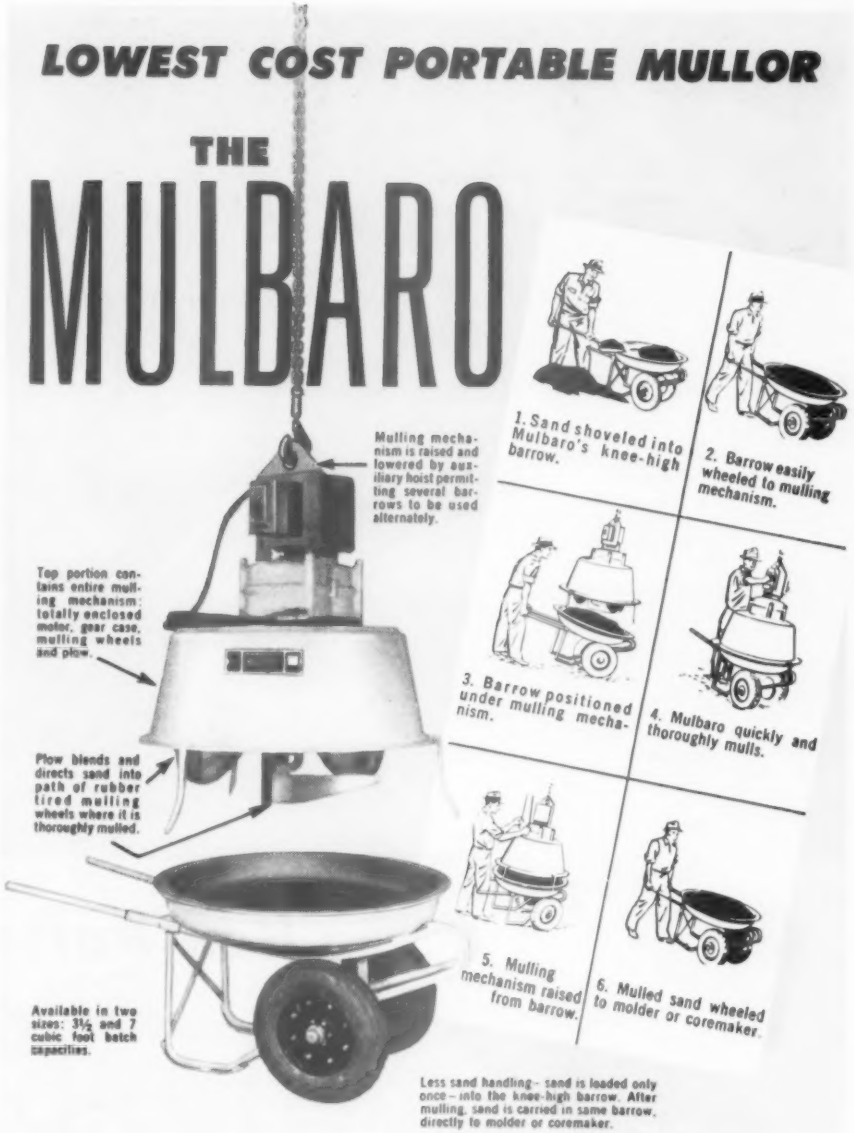
Foundrymen will be particularly interested in the author's appraisal of the foundry industry. In discussing the organization of the Foundry Equipment and Supplies Section, he states: "The foundry industry, comprising the manufacturers of steel castings, gray iron and malleable iron castings, and nonferrous castings, was one of the most important factors in manufacturing from 1938 to the end of the war. The foundry equipment and supplies industries were, of course, essential to the manufacture of castings."

This reviewer would like to add a word of personal appreciation for the tremendous work of the author in preparing this history. I joined the Tools Division just one month after Dean Bradley Stoughton, and was assigned an adjoining desk. For 11 months it was my privilege and pleasure to work with the Dean, to receive his advice and encouragement, and to gain from his vast fund of knowledge. His present work brings back memories of stirring days, when industry and government worked as a team to accomplish more than seemed remotely possible.—F.G.S.

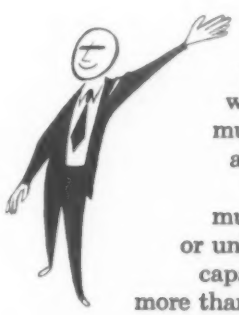
Industrial Truck Division, Baker-Raulang Co., Cleveland, has appointed the J. A. Webb Belting Co., 92 Pearl St., Buffalo, as its representative in western New York and northwestern Pennsylvania. The company is headed by Howard P. Webb.

LOWEST COST PORTABLE MULLOR

THE MULBARO


Mulling mechanism is raised and lowered by auxiliary hoist permitting several barrows to be used alternately.
Top portion contains entire mulling mechanism: totally enclosed motor, gear case, mulling wheels and plow.
Plow blends and directs sand into path of rubber tired mulling wheels where it is thoroughly mulled.
Available in two sizes: 3½ and 7 cubic foot batch capacities.
1. Sand shoveled into Mulbaro's knee-high barrow.
2. Barrow easily wheeled to mulling mechanism.
3. Barrow positioned under mulling mechanism.
4. Mulbaro quickly and thoroughly mulls.
5. Mulling mechanism raised from barrow.
6. Mulled sand wheeled to molder or coremaker.

Less sand handling - sand is loaded only once - into the knee-high barrow. After mulling, sand is carried in same barrow, directly to molder or coremaker.



The *really* portable Mulbaro is easily moved about the foundry or core room and the sand is mulled in the same barrow in which it is brought to and taken from the mullor. The sand is handled only once! With an additional barrow or barrows, the Mulbaro mulls almost continuously. While the sand is being mulled in one barrow another is being loaded or unloaded. Thus the Mulbaro offers the capacity of two or more mullors for slightly more than the price of one . . .

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New Pattern Material

Has Unusual Characteristics

ABOUT three years ago, the Sag-U-Mat Co. of Greenwood, Mass., became interested in the application of densified wood for manufacturing patterns for foundry use. Densified wood, composed of highly compressed, resin-impregnated veneers, possesses such attractive features as being harder than any solid wood and lighter than any solid metal. It is resistant to abrasion and scuffing, to temperature extremes and moisture absorption. In addition, the pattern material has been machined on conventional woodworking and metalworking machines at surface speeds up to 3000 fpm with a resultant smooth, hard surface which can be buffed to a high gloss.

Although suitable for many applications, the densified wood, as originally available, was not completely satisfactory for pattern use, especially in the case of pattern plates. After study of the problem and considerable experimental work, a type of densified wood has been developed which withstands excellently the hard usage to which it is subjected in the foundry. Three years of actual experience, involving manufacture of 500 patterns by Union Gear & Machine Co., Boston, have demonstrated production savings as high as 50 per cent as compared with previous patternmaking costs.

The material is available in sheets 30 x 48 in. from ½ to 2 in. in thickness in steps of ⅛-in., and is distributed by Pioneer Foundry & Mfg. Co., Gilbertville, Mass. Where sections heavier than 2 in. are required, the desired thickness may be fabricated from sanded stock by

(*Concluded on page* 154)

Fig. 1—A drill press and special tool are used to machine cavities in the pattern plate. Fig. 2—Cope side of the plate before attachment of pin guides and gating system. Fig. 3—Drag side before assembly (at left) and partially assembled (at right). Fig. 4—Turning circular pieces for the drag pattern at surface speed of 3000 fpm

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Take the Job to SKIL Bench Grinders...

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SKIL Aerial Grinders

Take SKIL Aerial Grinder in your hands . . . feel how firmly it fits your grip . . . feel the perfect balance that makes accurate grinding easy and sure. Then watch how its extra power quickly grinds down weld beads, mold irregularities, takes off burrs and fins. Stronger, die-cast aluminum alloy housings, the finest gears and bearings, smooth-running motors make SKIL Aerial Grinders last longer . . . make them thrive on the roughest going. Put SKIL Aerial Grinders on your toughest jobs. You'll find it pays.

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SKIL ELECTRIC Tools PNEUMATIC
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SKIL Bench Grinders

Speed up maintenance and production grinding with SKIL Bench Grinders. Their big, powerful motors are designed for heavy loads and sustained use. They're dynamically balanced to run quietly . . . without vibration. Easily adjusted machined tool rests make accurate grinding easier. Wide wheel guards give you more work room. Take advantage of extra-quality construction . . . sealed oversize ball bearings . . . high starting torque . . . get SKIL Bench Grinders for all sharpening, grinding, polishing and buffing.

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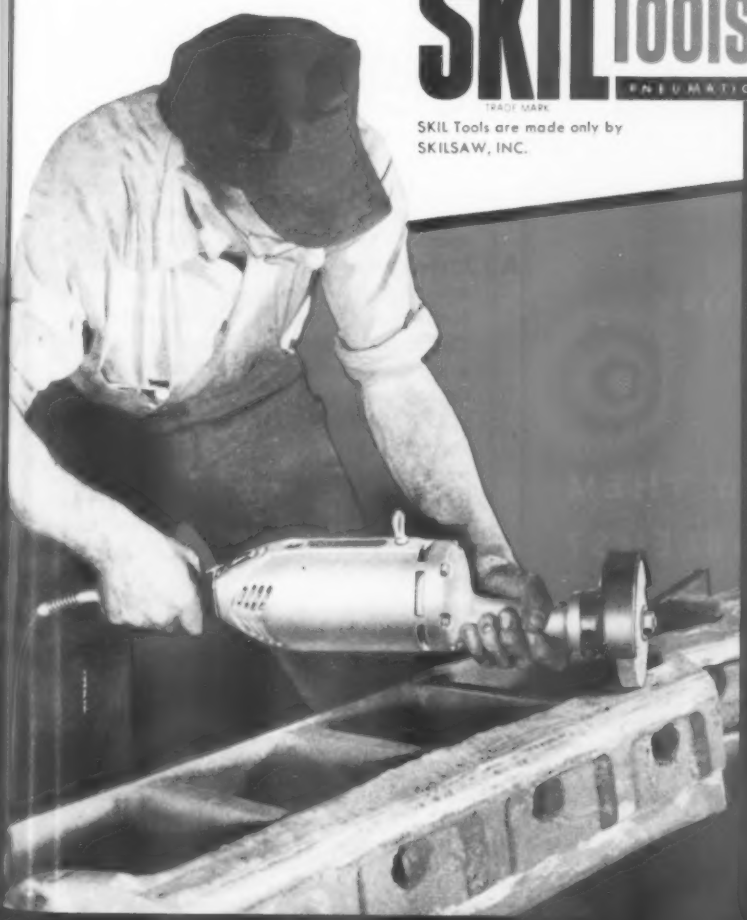
In Canada: SKILTOOLS, LTD.,
66 Portland St., Toronto, Ont.



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OR FUEL OIL

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REQUIREMENT

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

HAVE YOU INVESTIGATED THEM
FOR YOUR MELTING PROBLEMS?

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Concluded from page* 152)

using a resin adhesive. A resorcinol resin adhesive that sets at room temperature is usually employed, providing full binding strength within a few hours. However, the application of heat will shorten the set time of the adhesive. Similarly, if a pattern change is required, the section to be changed is machined off, routed out, etc., and a new section of the pattern material is fastened in place with the adhesive. Then the piece can be reworked.

This type of densified wood, which has a specific gravity of 1.35, is 22 per cent lighter than magnesium and one-half the weight of aluminum. To indicate the simplicity of converting the material into finished patterns, the accompanying illustrations are included. They show some of the steps involved in producing a double-face matchplate for two solid-web gear blanks 6-in. in diam. with a 1¼-in. face. From start to finish the complete operation required 2½ hours.

Describes Various Steps

As in any pattern construction procedure, the first step is selecting material of the proper dimensions, which in this case was ½-in. thickness for the mounting or pattern plate and 1¼-in. thickness for the drag patterns. The uniformity of the material obviates the further need of careful selection of stock. Lines are scribed on the material to indicate the desired outlines, which are then cut on a band saw.

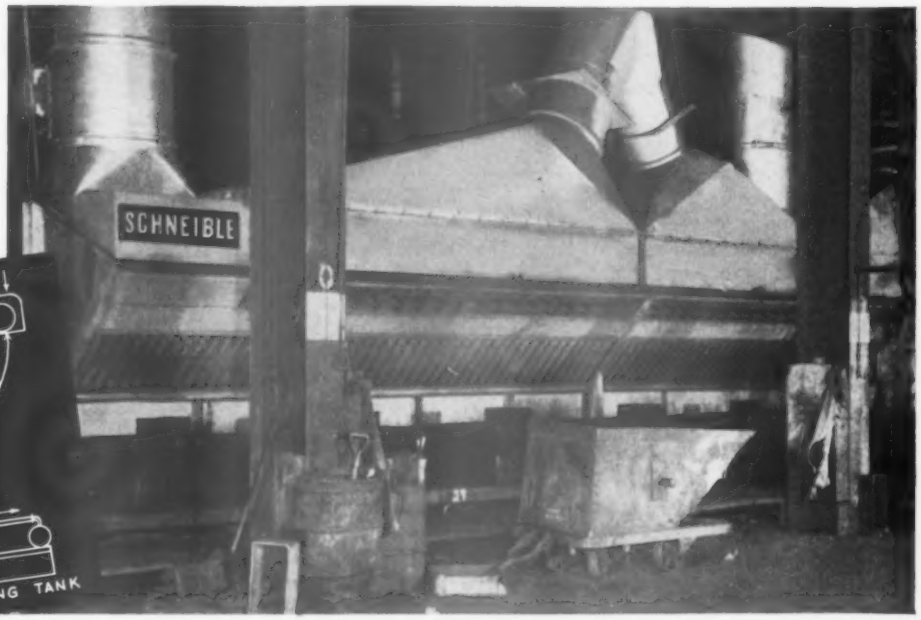
In the case of the pattern plate, center lines are scribed and holes drilled and tapped for attachment of the disk patterns on the drag side. Then with those holes as centers the piece is placed on the platen of a drill press, and cavities to form the web are machined out with a special tool as shown in Fig. 1. Circular pieces for the drag pattern are mounted on a lathe stud, and blanks are finished turned all over. These operations are carried out at a surface speed of 3000 fpm., as indicated in Fig. 4.

Fig. 2 shows the cope side of the board before the flask pin guides and gating system are attached. Fig. 3 shows the drag side of board before assembly on the left and partial assembly on the right. The threaded studs shown, which are the only means used to attach patterns to pattern plates, are also made of densified wood.

The 500 patterns previously mentioned, which were constructed in similar fashion, have withstood from two to three years of foundry usage without dimensional change.

STEP UP NEXT WINTER'S EFFICIENCY...
Install "Compensating Air" Hoods *Now*—

U. S. and Foreign Patents Pending



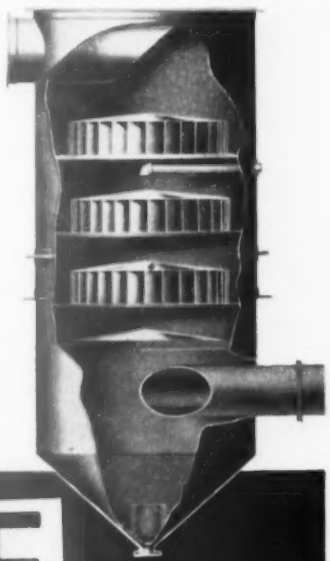
Schematic drawing showing layout of system for compensating air unit.

LOWER Ventilating and Heating Costs *Too!*

To LOWER your foundry ventilating and heating costs and improve working conditions at the same time, put the Schneible "Compensating Air" principle to work for you.

If the weather's hot, air supply is taken from high inside the foundry, in severe weather outside air is used . . . in both cases the result is efficient control of air to suit climatic variations. Heat is dissipated in summer and conserved in winter, thus creating comfortable work station temperatures the year 'round with no loss of valuable warm air when most needed.

Be sure to consult us when considering more efficient dust and fume control measures.



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Write for our bulletin number 548 containing complete Uni-Flo Hood information.

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INDUSTRY Briefs

DUCTILE cast iron, developed by International Nickel Co., New York, is now being produced by the following foundries throughout the United States, under pending patent applications: Albion Malleable Iron Co., Albion, Mich.; the Anstice Co. Inc., Rochester, N. Y.; Atlas Foundry Co., Irvington, N. J.; Benton Harbor Malleable Industries, Benton Harbor, Mich.; Bison Castings Inc., Buffalo; Chambersburg Engineering Co., Chambersburg, Pa.; Cooper-Bessemer Corp., Grove City, Pa.; Dostal-Per Mold Foundry Co., Pontiac, Mich.; Francis & Nygren Foundry Co., Chicago; Kutztown Foundry & Machine Co.; Kutztown, Pa.; Lynchburg Foundry Co., Radford, Va.; Motor Castings Co., Milwaukee; Noblesville Castings Co., Noblesville, Ind.; Pitz Foundry Inc., Brooklyn, N. Y.; Prospect Foundry, Minneapolis; Ritter Co. Inc., Rochester, N. Y.; Sacks-Barlow Foundries Inc., Newark, N. J.; James Spence Iron Foundry, Jersey City, N. J.; Sterling Foundry Co., Wellington, O.; Straight Line Foundry & Machine Co., Syracuse, N. Y.; Texas Foundries Inc., Lufkin, Tex.; Treadwell Engineering Co., Easton, Pa.; and Youngstown Foundry & Machine Co., Youngstown, O.

* * *

War Assets Administration has sold to Ohio Steel Foundry Co., West Fourth St., Lima, O., the government-owned steel casting and foundry facilities there, for $1,050,000. The company has been operating the facilities under lease since 1946. The wartime plant has been reconverted to production of steel rolls and a large amount of the original equipment has been sold.

* * *

Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y., has announced completion of arrangements with Sonith Industries Inc., 50 Shelby St., Indianapolis, for manufacture and sale of Meehanite castings. Through its London office, International Meehanite Metal Co. Ltd., the company has licensed the following plants in Europe: N. V. Holland, Bergen-op-Zoom, Holland; N. V. Wilton Fijenvord, Schiedam, Holland; and Officine Fonderie Meccaniche Oggionese Arturo Carniti, Oggiono, Italy.

* * *

In the Industry Briefs section of THE FOUNDRY, June, 1949, it was erroneously reported that Baltimore Foundry & Machine Corp., 1901 South Charles St., Baltimore 30, was a branch of McConway & Torley Corp., 48th & Dunbar Sts., Pittsburgh. According to Grover L. Michael, treasurer, Baltimore Foundry & Machine Corp., there is no connection between the companies.

* * *

Aluminum & Brass Co., 46 Caledonia St., Lockport, N. Y., which suffered a loss of $300,000 when its foundry burned on May 24, has acquired the plant of Central Foundry Division, General Motors Corp., at 51 Lock St., Lockport, which was closed early this year. Full production is expected by September.

* * *

Bell Aircraft Corp., P. O. Box 1, Buffalo 5, has announced the appointment of Russell F. Lincoln & Co., 1058 Maplecliffe Drive, Lakewood, O., as special representative to the foundry industry in northeastern Ohio, for the sale of its powered wheelbarrows and related products.

* * *

Combined volume of shipments of ingot brass and bronze, as reported by the Ingot Brass & Bronze Industry, Chicago, was 11,114 tons for May, 1949, compared with 10,695 tons for April and 23,716 tons for May, 1948.

* * *

Foundry Services Inc., 280 Madison Ave., New York, has appointed Dayton & Bakewell, 1939 Santa Fe Ave., Los Angeles 21, as its sales representative in the Los Angeles area. Industrial Foundry Supply Co., 1434 Howard St., San Francisco 3 has been appointed San Francisco area representative for Foundry Services' products.

* * *

Interest of Norman Stanley in Stanley Foundries, 6009 Santa Fe Ave., Huntington Park, Calif., has been purchased by W. W. Stevens Jr. and R. F. Taylor. Mr. Stevens formerly was associated with Electro Metallurgical Sales Corp., and Mr. Taylor with Balfour Guthrie & Co.

* * *

Mid-West Abrasive Co., Owosso, Mich., has bought the main plant of Michigan Sugar Co., Owosso, for storage and future expansion of the company's operations. The four-story brick structure contains approximately 95,000 sq ft of floor space.

* * *

Atlas Imperial Diesel Engine Co., Oakland, Calif., which acquired the manufacturing assets of Lorimer Diesel Engine Co., Oakland, as reported in the July issue, states that it is not controlled by the Bank of America, as indicated in the original report.

* * *

Aluminum Alloy Division of Vanadium Corp. of America, 420 Lexington Ave., New York 17, is in commercial production at a new plant in Chester, Pa. A variety of aluminum-rich alloys is being made for use by the basic metal industries.

* * *

Grede Foundries Inc., has consolidated operations of its Milwaukee Steel Division, at 435 South Water St., within the Smith Steel Division, at 1320 South First St., Milwaukee. Milwaukee Steel Division was closed several months ago.

* * *

Milwaukee Chaplet & Mfg. Co., 1023 South 40th St., Milwaukee 4, has been appointed distributor in Wisconsin to handle grinding wheels and abrasive products manufactured by Bay State Abrasive Products Co., Westboro, Mass.

* * *

Walsh Refractories Corp., formerly of 4070 North First St., St. Louis 7, has moved into new general offices at 101 Ferry St., St. Louis 7.

* * *

Lundin & May Foundry Co., 454 West Fifth North St., Salt Lake City, Utah, plans construction of a $70,000 foundry.

* * *

Girdler Corp., 224 East Broadway, Louisville 1, has appointed the John M. Frey Co., 624 South Michigan

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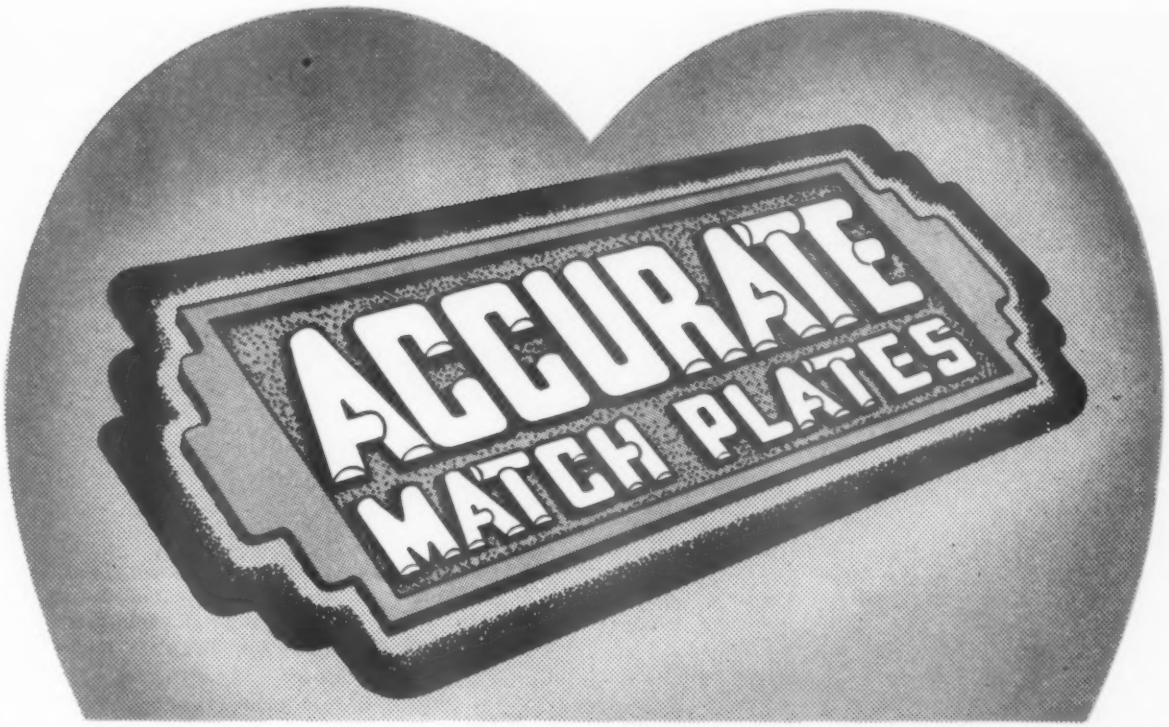

The heart of every casting is the pattern...so it has to be "accurate"

The ACCURATE MATCH PLATE COMPANY is a specialized organization with the ability to meet your requirements accurately.

We are foremost in the manufacture of pressure cast match plates, both as to quality and quantity.

Our plant is a modern building, housing specialized equipment and highly skilled artisans under able supervision.

We manufacture the following types of PRESSURE CAST EQUIPMENT from Plaster Molds:

Aluminum MATCH PLATES, COPE AND DRAG SETS,
CORE BOX CASTINGS, and white metal and aluminum
PATTERN CASTINGS.

Aluminum cast under pressure in plaster molds insures accurate dimensions, adherence to detail and smooth surfaces.

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SQUEEZE DRAGS and ELIMINATE BUTT-RAMMING with the SPO No. 413-D JOLT SQUEEZE ROCKOVER DRAW MOULDING MACHINE . . . More drags, because time-consuming butt-ramming is not necessary. Better drags, because mechanical squeeze replaces hand butt-ramming. This two-way saving is found only in this SPO rockover draw molding machine. Other advantages, too ... mold clamp, leveling device and pattern draw—all air-operated. Advantages that pay real profits are found in all SPO machines, built to endure.

MEMBER

Always find out first what SPO has to offer.

SPO INCORPORATED

Specialists in Molding Machines, Vibrators and Patterns for Production

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(*Concluded from page 156*)

Blvd., Chicago, to handle its line of core baking equipment in that territory. High Frequency Foundry Sales Corp., 76 Beaver St., New York, will represent Girdler Corp. in the New York district.

* * *

Yale & Towne Mfg. Co., Philadelphia Division, officially opened its new branch plant housing manufacturing, maintenance and service facilities and office space at 5845 Centre Ave., Pittsburgh 6. Many industrial leaders from the area attended the May 20 opening.

* * *

Laclede-Christy Co., St. Louis, has contracted with Davis Fire Brick Co., and its affiliates, the Ohio Fire Brick Co. and Cambria Clay Products Co., Oak Hill, O., for the manufacture of silica brick, acid-proof brick, and Ohio fire brick.

* * *

Fields Corner Brass Foundry, 9 Sturtevant St., Dorchester, Mass., was partially destroyed by fire which started in the melting room June 23, with estimated damage of $20,000. Louis Moisell is owner of the foundry.

* * *

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, has purchased the former Leece-Neville Co. plant at 5363 Hamilton Ave. for expansion purposes. The plant acquired contains 82,000 sq ft of floor space.

* * *

Richmond Radiator Co., which last fall closed down the foundry at its Uniontown, Pa., plant is disposing of its foundry equipment there. This move does not affect the company's other operations at Uniontown.

* * *

American Air Filter Co., Louisville 8, has appointed Industrial Sales & Engineering Co., Memphis, Tenn., operated by C. W. Dean, as dust control representative in Memphis and vicinity.

* * *

American Marine Brass Foundry Inc., 22 Berriman St., Brooklyn 8, N. Y., has changed its name to American Art Foundry Inc. The company specializes in ornamental bronze castings.

* * *

Frazer & Jones Co., division of Eastern Malleable Iron Co., 3000 Milton Ave., Syracuse, N. Y., has installed hot dip metal equipment for galvanizing malleable iron castings.

* * *

Fabreeka Products Co. has moved its Chicago office from 225 North Wabash Ave. to 325 West Huron St.

Cost Conscious?

Then you'll like the Cost-Cutting Features of NORTON B-5 and B-7 Resinoid Wheels

YOU'RE on the lookout these days for new methods of trimming production expenses. Have you thoroughly investigated the possibility of reducing grinding costs?

Many foundries have been able to make substantial savings on grinding jobs by taking advantage of Norton B-5 and B-7 Resinoid Wheels and the helpful advice of their Norton abrasive engineers.

You'll find that Norton wheels with these outstanding resinoid bonds—B-5 for wheels in the soft and medium-hard range, and B-7 for wheels in the harder range—and with ALUNDUM or CRYSTOLON abrasive, really do cut faster and smoother without sacrifice of wheel life. Why not arrange for a trial soon with your Norton abrasive engineer?

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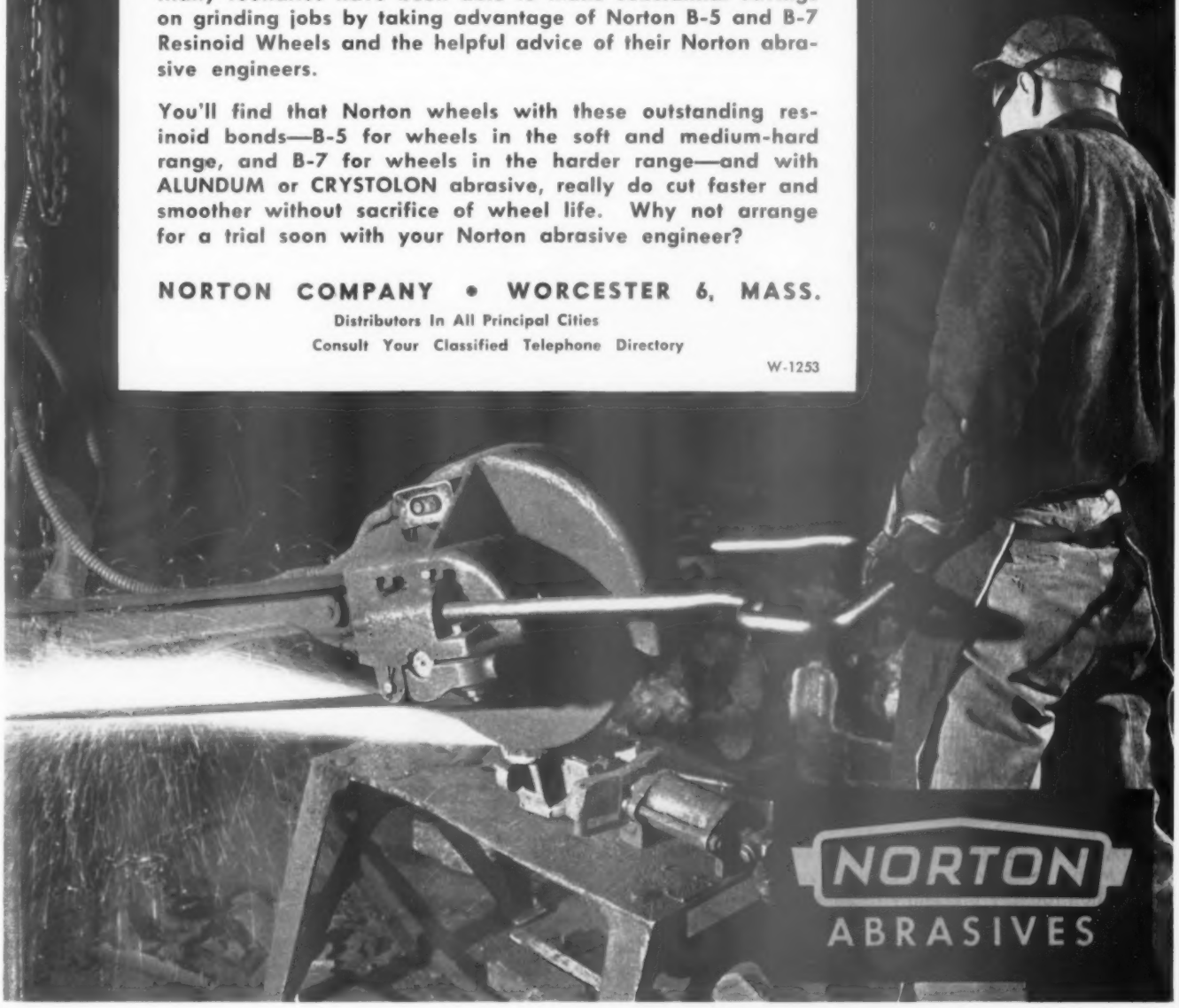

Bitten by the

Foundry Bug

By RALPH L. LEE

(*Continued from page* 73)

drafting board, I designed my first casting I asked my Dad to look it over and tell me what he thought. After looking at it for a moment he kind o' shook his head and said, "I'll tell you what to do—take this drawing over and show it to Fred."

"Fred who?" I asked.

"You know, Fred Schmidt, the head of the pattern shop."

"But why?" I asked.

"Never mind son, you go on and do as I tell you."

When Fred saw my drawing he chuckled and said "So you're Charley Lee's boy—well, that's just like Charley. Tell you what let's do, let's go over and see Joe."

"Joe who,'" I asked.

"Joe Frazer," Fred said, "the head of the foundry."

"Oh!" I said, "you mean Joe."

So over we went to see Joe. We had quite a session, the three of us and one I shall never forget. Joe and Fred showed me the needless difficulties I had ignorantly designed into my casting. Because I didn't know enough about foundry practice or hadn't given it any thought, my casting couldn't be made without a core. Not only that but it was a nasty job any way you went at it.

Needless to say I took my drawing back with me together with the dope I had gotten, and I redesigned the casting, with the determination that from then on I was going to work hand and glove with Joe and Fred. After that I never turned out a drawing for a casting that I wasn't sure could be made with the least foundry trouble. If there was any doubt in my mind I got in touch with the pattern shop and foundry boys and let them get their licks in before I turned the drawings loose.

A hobby shop of one kind or another has been a tradition in our family clear back for generations. My machine shop started right after Mother and I were married. It wasn't very long after that till I got me a washboiler full of molding sand and made a little wooden snap flask—I wouldn't be surprised that it is still around the place somewhere. I lined up a little garbage pail for a melting furnace and heated it with gas and air from an old vacuum cleaner. Then I bought me some little crucibles, and began making simple castings.

I went through all this because I got sick and tired of hogging things out of solid chunks of metal. Sawing, chiseling, filing, boring, turning, milling and drilling away piles of chips and shavings. Even today I see mechanics going clear around Robin Hood's barn to make something not half as good as it could be produced through the casting route.

But anyway, as I went ahead with my hobby foundry it gradually dawned upon me that molding was not just another manufacturing operation but in itself was a whole field of creating useful products. More than a method, it was an art for creating things that couldn't be created any other way. Maybe I'm getting too elementary for you foundry experts but I still can't get over the wonderment at the contrast between hogging things out of tough and hard hunks of metal on one hand and the whittling of soft wood and working with obedient molding sand on the other.

When we planned to build our new house some eight years ago Mother said, "There is one thing for certain, in the new place I am not going to be awakened in the middle of the night suffocating with that awful smell coming up from that old oven you have in the basement. Nor am I going to have those shavings and dirty sand being dragged up from the basement on my new carpets."

So we put up our foundry and pattern shop building on the back of the lot.

Gives Better Comprehension

Like hangar flying is the end point of learning to fly, so talking to my foundry pals who come to visit me in the shop is the real pay-off to my foundry hobby. Here's a funny thing—lots of foundry folks who have been in the business for years tell me that for the first time they really get a close up feel of the overall molding art when they visit my shop. Spending their days in only one department, they see in my little place the whole procedure within arms reach, from the drawing board through the pattern shop, the sand pile, bench, flask, floor, cupola, furnace, coke, shakeout; the whole works with each step holding hands with the next.

Now that I think of it, I don't believe there is any other business in which any one step tells so little of the steps to follow, the steps to come or the meaning of the whole. Leave out the pattern shop and the foundry topples over like a man whose head has been cut off. Leave out one link in the chain and the chain falls apart. Look at any one operation without a knowledge of the rest and it isn't interesting. But with molding considered as a complete and exclusive art and the only way of making some things, then the heat, the smoke or what have you are taken for granted as part and parcel of the trade. I know that I take a great deal of pride in feeling comfortable under the conditions of the trade that frighten or repel outsiders.

It is a wonderful thing to think up some nifty design for a paper knife, an ash tray, frying pan, faucet, lamp, pulley, door knocker, drill press or even a sash weight and know you have the know-how, the skill and the

(*Concluded on page* 162)

VISITATION: The senior class of Hackley Manual Training High School, Muskegon, Mich., recently visited Engineering Castings Inc., Marshall, Mich.—a small production foundry efficiently designed for precise production control in a minimum of space with minimum labor. Melting is done exclusively in electric arc rocking furnaces, and the metal is poured directly into stack molds which are moved to and away from the furnaces on gravity roller conveyors. Fifteen workers in the 60 x 80-ft foundry produce nearly 500,000 individual castings per month

NEW No. 3 SIMPSON MIXER

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OF SAND PREPARING PLANT *at* LYNCHBURG FOUNDRY CO.
LYNCHBURG, VA.

IMPROVED SURFACE FINISH AND MARKED REDUCTION IN SCRAP LOSS RESULTED WHEN A NO. 3 SIMPSON MIXER WAS RECENTLY INSTALLED TO AUGMENT CAPACITY OF EXISTING UNIT.

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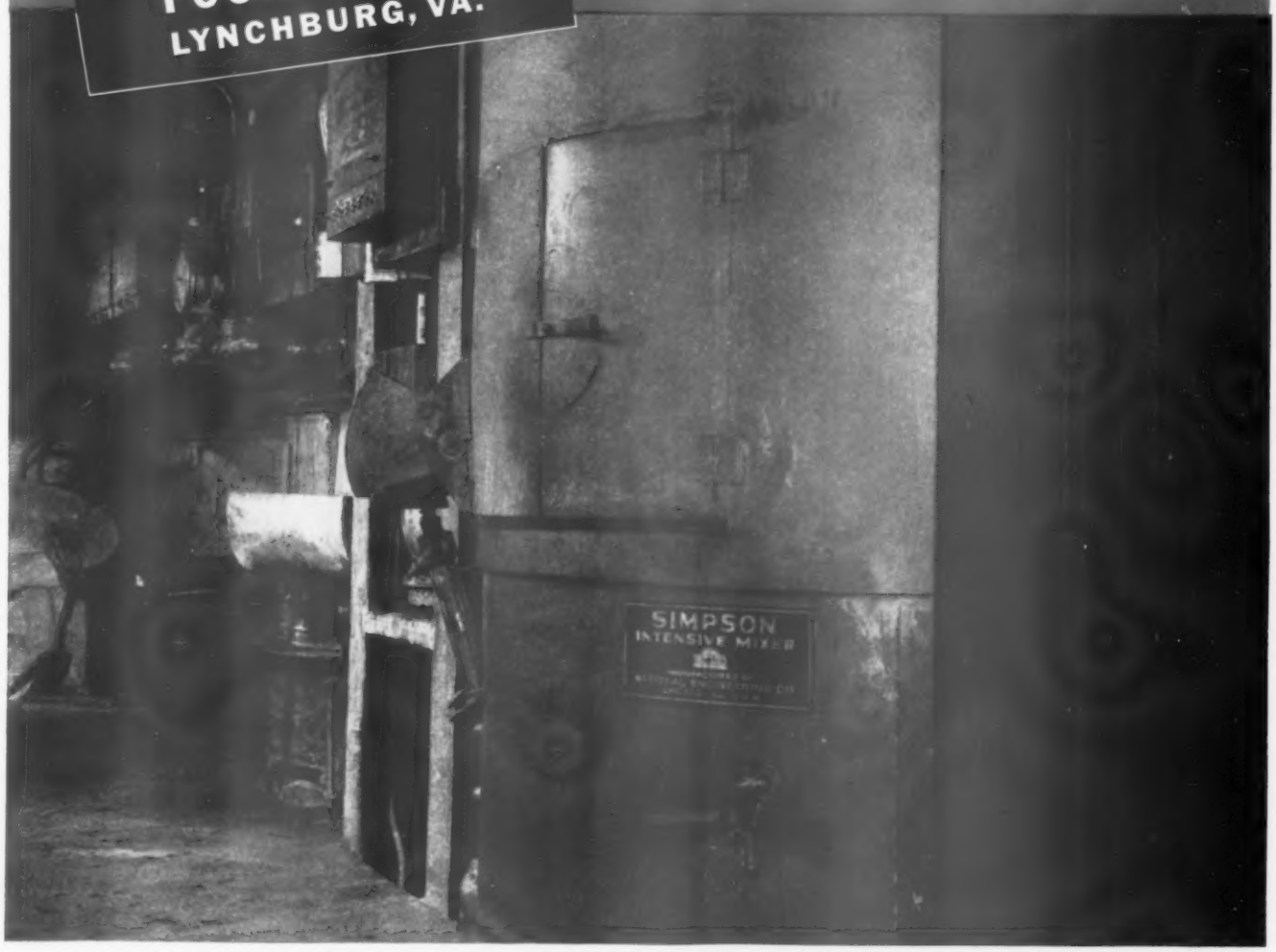

SIMPSON MIXERS WILL HELP YOU TO IMPROVE YOUR PRODUCT AND REDUCE COSTS. YOUR NATIONAL ENGINEER WILL BE GLAD TO ASSIST IN PLANNING THE INSTALLATION.

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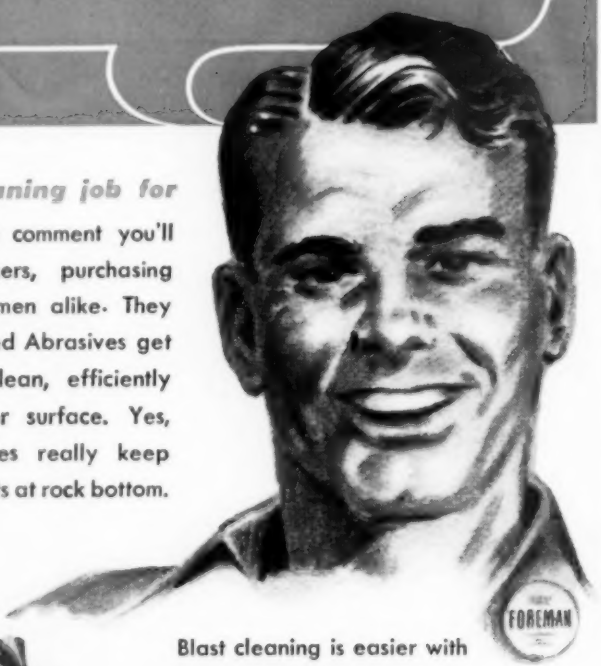
does a better cleaning job for us



A better cleaning job for us . . . that's the comment you'll hear from owners, purchasing agents and foremen alike. They all agree, Certified Abrasives get castings really clean, efficiently produce a better surface. Yes, Certified Abrasives really keep blast cleaning costs at rock bottom.

Blast cleaning is easier with Certified. Both Samson Shot and Angular Grit can be used over and over again. With them on your job you get *more work done . . . every day.* Order Certified today for better cleaning!

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS.

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PA

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

(*Concluded from page* 160)

where-with-all to convert these imaginary things into real touchable and useful things through the substances of sand, heat and sweat. There is nothing like it among all the ways of making things.

It has often been said, and it is true in every sense of the word, that everything we have and use started out with a casting. Founding is truly the foundation of all industry. Without the foundry there can be no industry. The foundry has come a long way and it is here to stay. But the important thing is that there is still plenty of room in it for honest, hard working, open minded and ingenious young men to do a lot for themselves.

There is a fine future in the foundry business — we haven't even scratched the surface. New inventions are crying to be made, new equipment is needed, new materials and new buildings. But above all, it seems to me that we need new ideas on the uses of castings which have been sadly neglected in the past. Thousands of articles are being made the wrong way, just waiting for us to open our eyes.

Even after all I have said on this subject I may have failed to answer with words the question as to why I like the foundry business so much and why I have made it my hobby. Maybe between my words you have felt my sincere enthusiasm. But regardless I know without a question of doubt that I have definitely been bitten by the foundry bug. Not only have I been bitten, but I have broken out with the rash and walk around in a high fever of interest in the foundry, and everything in it, including its people.

If I were a young man again I certainly would go into the foundry business for a life time career of useful, interesting and profitable work.

Instrument Groups Plan Conference

The fourth national Instrument Conference and Exhibit will be held at St. Louis Auditorium, St. Louis, Sept. 12-16. The conference and exhibit is sponsored by the Instrument Society of America, 921 Ridge Ave., Pittsburgh, with the co-operation of the American Institute of Physics, Industrial Instruments and Regulators Division of the American Society of Mechanical Engineers, and the Instruments and Measurements Committee of the American Institute of Electrical Engineers. Over 130 exhibitors have reserved booths.

For Efficiency and Economy in Non-ferrous Melting

NORTON REFRACTORY CEMENTS are made in a variety of stable, highly refractory mixtures of high heat conductivity. MAGNORITE* Cements for lining high frequency furnaces melting nickel-chromium alloys; CRYSTOLON* Cements for ramming into reverberatory and pit furnaces melting aluminum, copper and zinc; ALUNDUM* Cements for burner posts in gas or oil fired billet heating and heat treating furnaces; MAGNORITE* Cements for low frequency vertical ring induction furnaces melting high copper alloys and cupro-nickel, nickel-silver and cadmium-bronze alloys.

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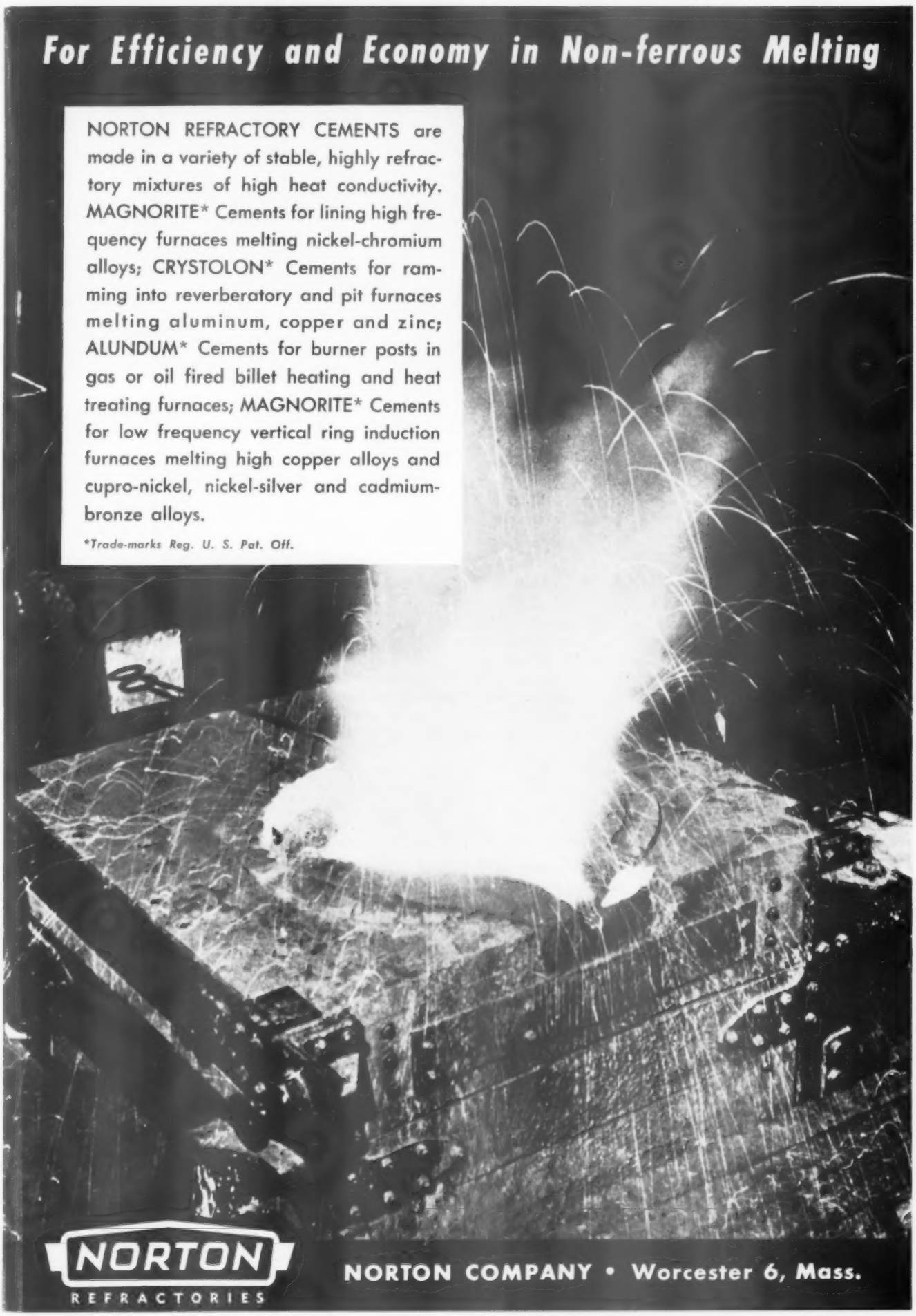

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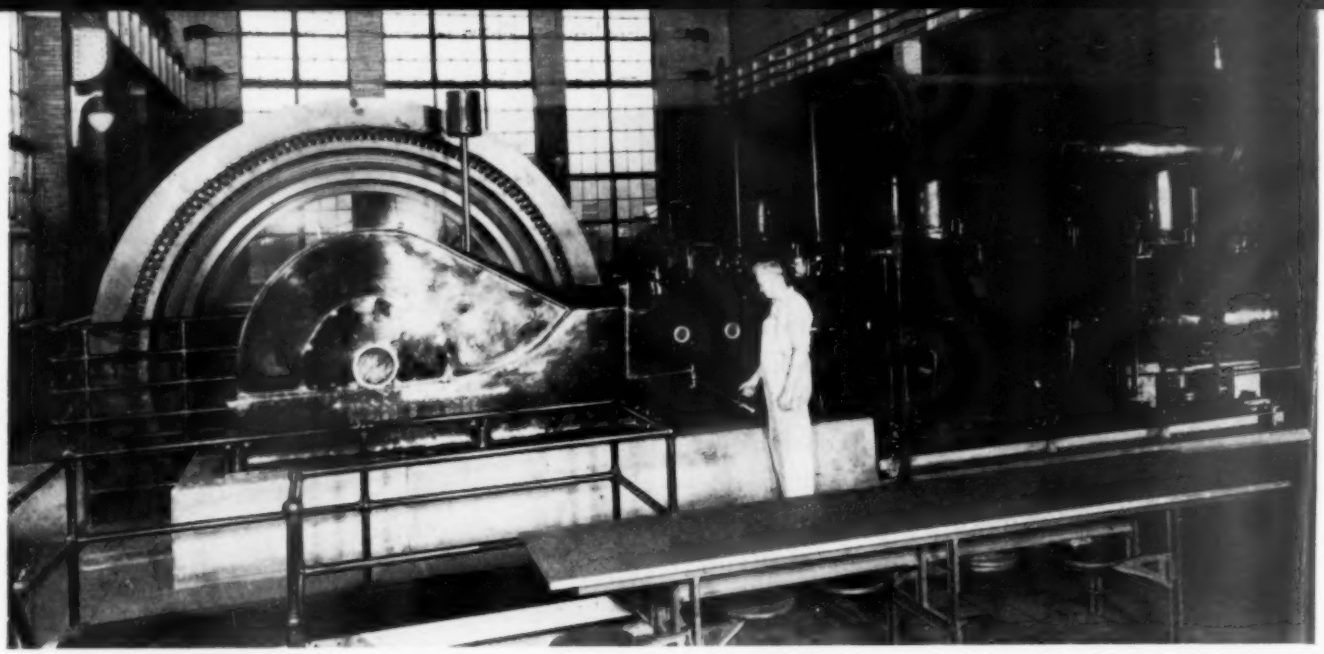


This 8000-cfm double air compressor is the heart of the Ford production air system

Compressed Air Use

In a Production Foundry

IT has long been a practice among industrial researchers, when seeking interesting and varied applications of power methods, to go to the automotive industry; there not only do they find what they seek, but often they find it in its broadest picture.

The use of compressed air is no exception, for the automotive manufacturer has made wide use of it, especially in the production foundry. True, compressed air has long been used in foundry work, but never to the degree to which the automotive industry, with its large production, has utilized it.

Take, for instance, the large production foundry at the Ford Motor Co.'s River Rouge plant. Daily, over 2300 tons of steel and iron are poured to produce over 1400 tons of finished castings, which range from large cylinder blocks to small brackets and fittings. Here, more than 60 per cent of the River Rouge plant's compressed air capacity is used.

Since a plant as large as the Ford River Rouge finds numerous uses for compressed air in its many buildings, an extensive system is necessary to maintain desired production levels. The plant has over 27 stationary compressor installations, which run from the double 8000-cfm unit to the small single 1000-cfm compressor, all of which contribute to maintain a capacity of 63,560 cfm, available to the entire plant.

Since the production foundry is the largest user, several compressor substations are located in the foundry building itself. These stations contain five stationary installations with a total capacity of 11,290 cfm and hold a constant 125-lb line pressure. However, even these units are not capable of satisfying the foundry's needs, and additional air is drawn from the plant-wide system.

Foundry applications of the compressed air are many and varied, but they can be broken down into the following divisions: (1) Operation of various machines and fixtures. (2) Operation of production hand tools. (3) Materials handling. (4) Operation of pressure gages and controls. (5) Cleaning operations and maintenance of the building itself.

Major use falls into the first group—operation of machines and fixtures—and of these units the largest consumers are core blowers. Other important users are molding machines for production of molds and large cores, and shot blasting machines. Among the hand tools utilizing compressed air are pneumatic hand rammers, portable grinders and chippers. In addition to work on molds and castings, hand tools also are employed on equipment maintenance. Air-operated vibrators are used in sand bins to keep the sand from bridging.

(*Concluded on page* 166)

Compressed Air Delivered to Various Buildings

Building	December Air Charge	Hours × 60 = Minutes		Average Cfm	Peak Cfm
Blast Furnace	2,970,000	720	43,200	68.6	142.0
Paper Mill	7,000	456	27,360	.25	.5
Pig Cast	850,000	720	43,200	19.7	41.0
Soy Bean	35,000	480	28,800	1.22	2.5
"EE" Building	2,058,000	504	30,240	68.0	141.0
New Oil House	1,255,000	480	28,800	43.5	90.0
Garage	967,000	480	28,800	33.6	70.0
Coke Ovens	10,470,000	720	43,200	242.0	500.0
Tool & Die	4,205,000	552	33,120	127.0	263.0
"AA"	4,525,000	408	24,480	185.0	383.0
Prod. Foundry	426,914,000	480	28,800	14,820.0	30,680.0
Rear Axle	6,840,000	480	28,800	237.0	491.0
Glass Plant	5,730,000	352	21,120	271.0	561.0
Rolling Mill	45,800,000	408	24,480	1,870.0	3,870.0
Motor	16,960,000	408	24,480	693.0	1,435.0
Jobbing Foundry	14,780,000	480	28,800	513.0	1,062.0
Spring & Upset	12,270,000	432	25,920	473.0	980.0
Press Shop	21,740,000	320	19,200	1,130.0	2,334.0
"B"	5,765,000	304	18,240	316.0	654.0
O. Hearth	8,185,000	720	43,200	189.0	391.0
Rubber Plant	18,030,000	480	28,800	626.0	1,296.0
Hi Line	8,400,000	320	19,200	428.0	886.0
Steel Foundry	30,950,000	304	18,240	1,700.0	3,520.0

This Foundry is A GOOD PLACE TO WORK

HOWARD FOUNDRY CO., *Semi-Steel Division*

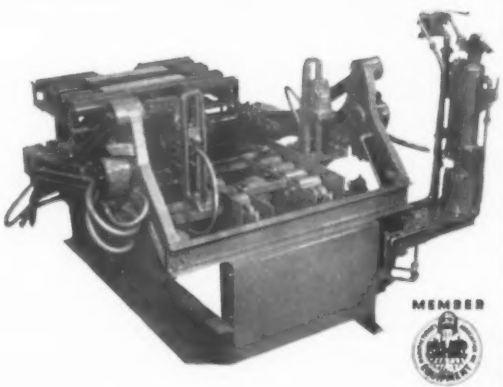
THIS MODERN FOUNDRY covers ten acres in the heart of Chicago's West Side Industrial Center.

All types and sizes of castings from less than a pound to over 20,000 pounds are produced here. Plant has a capacity of 50 tons a day. The use of such facilities as 3 modern cupolas with scientific controls; core blowers; conveyor type core ovens; cleaning equipment; 13 overhead cranes (5 to 20 ton capacities) make it one of the best equipped in the country.

It is a good place to work also because safety and good housekeeping are by-words with the company, resulting in the full use of dust collection systems, grinder guards, safety wearing apparel, etc.

Company specializes in high strength alloy iron castings of 50,000 P.S.I. used in diesel engine water jacketed

heads and liners, also highly stressed pistons. These parts are made with intricate cores; and dry and green sand molds.



Illustrated herewith is the relatively new and unusual Herman 750 lb. series Charging Conveyor Type Rollover and Draw Machine, several of which are used by Howard Foundry for the production of cores. These machines work on a loop directly from a core blower and incorporate a special turnover plate, clamps and direct acting vibrator. They are available throughout our complete range of machines, from 525 lbs. to 40,000 lbs. rollover capacity at 80 lb. air pressure.

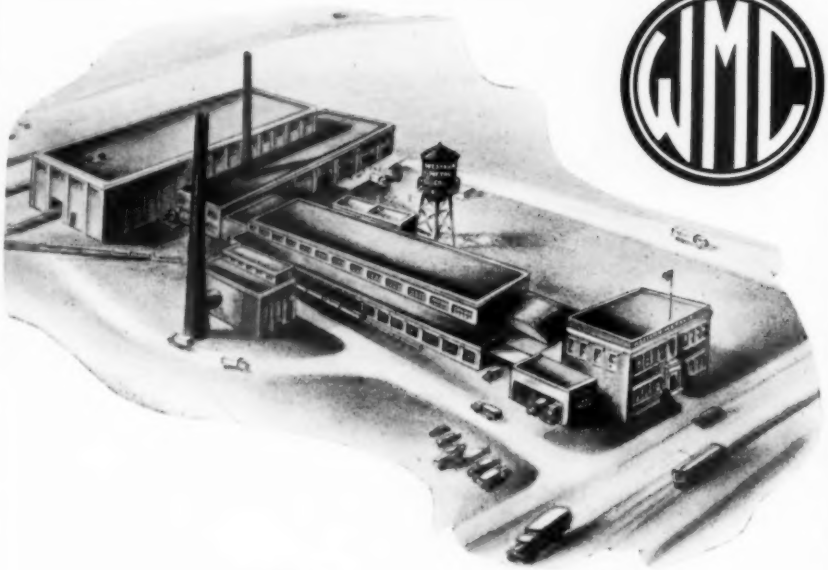
Can we tell you more about these or other Herman molding machines that have made their way by the way they're made?

MEMBER

Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

CAPACITY TO SERVE!



QUALITY INGOT METALS

Brass • Bronze • Aluminum to your specifications

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The foundryman not only must produce quality castings but he is faced with the problem of giving prompt service while keeping his metal inventory at a minimum.

By using Western Metal Co.'s "special delivery" service you are assured of highest quality ingot in the shortest possible time. LET US CARRY YOUR INVENTORY. Phone or wire for immediate delivery from our complete warehouse stock.

Complete Laboratory Facilities and Field Metallurgists at Your Service

WESTERN METAL COMPANY

Smelters and Refiners of Brass and Aluminum Ingots

3201 SOUTH KEDZIE AVE. CHICAGO 23, ILLINOIS

(*Concluded from page* 164)

The foundry's daily requirements of seacoal are derived from a central unit where the coal is pulverized and deposited in an air mixing tank. Suspended in compressed air, it is transported through pipes to a nearby power house, where some of it is drawn off and the remainder sent on to the foundry. Of the total daily production of 45 tons, 35 tons are used by the power house and in foundry melting furnaces, the remainder going into molds. Pulverized coal for the furnaces is stored in tanks in the foundry and blown into the furnaces as needed. The 10 tons required for molds also is stored in tanks and added to molding sand in proportions of 2 to 4 per cent. The pulverizing plant employs a single small compressor which maintains a 125-lb line pressure.

Air Compressor and Station Arrangement

Location	Compressor No.	Capacity, cfm
No. 1 Power House	1	1,800
No. 1 Power House	2	1,800
Sub No. 15	1	8,000
No. 3 Power House	1	8,000
Sub No. 16	1	2,000
Sub No. 16	2	1,200
Sub No. 16	3	2,000
Rolling Mill	1	4,300
Rolling Mill	2	2,000
Rolling Mill	3	2,000
Production Foundry	1	4,000
Production Foundry	2	2,290
Production Foundry	3	2,600
Production Foundry	4	1,250
Production Foundry	5	1,150
"AA" Building	1	1,200
Cement Plant	1	1,000
"WW" Building	1	1,150
Aircraft Building	1	1,668
Aircraft Building	2	1,668
Aircraft Building	3	1,668
Steel Foundry	1	1,668
Steel Foundry	2	1,668
Steel Foundry	3	1,668
Magnesium Foundry	3	1,668
Magnesium Foundry	4	1,668
Glass Plant	1	2,500
Total		63,560

Operating pressure 100 lb at all locations except 40 lb at Glass Plant.

Material for this article obtained by the Compressed Air and Gas Institute through courtesy of the Ford Motor Co., Dearborn, Mich.

Issues Cost Manual

Gray Iron Founders' Society, 210 National City-East Sixth Bldg., Cleveland 14, has published a revised "Basic Cost Manual for Gray Iron Foundries." The manual presents foundry cost fundamentals in simple, graphic form. Sections of the book are devoted to a general description of basic cost finding principles, how to install and operate the system and a special section of interest to managers, executives, sales managers, and others. The 51-page manual is priced at $5.

to cut casting costs . . . .

▲ *Part of our Milling Machine Section, where skilled workmen with precision machine tools handle a wide range of work.*

start with the PATTERN—(AND CORE BOXES)

IPW Service Can Save You Upwards of 20% on Overall Costs!

High precision patterns producing dimensionally accurate castings save three ways:

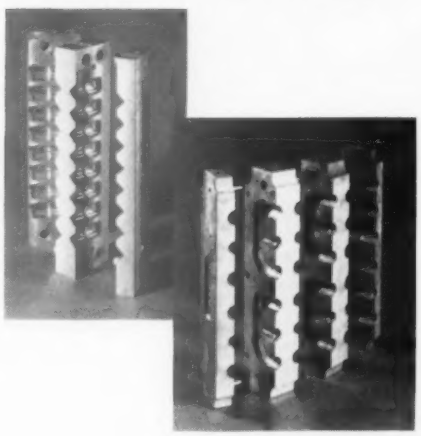
a. FOUNDRY TIME.

b. MACHINING TIME.

c. FOUNDRY AND MACHINE SHOP REJECTS.

These are tangible savings, which add up very conservatively to at least 20%. In many cases a cut of 35% has been made in overall costs, through the reductions all along the line.

It costs absolutely nothing to get full information about IPW Pattern and Core Box engineering service. Let us tell you how we can reduce your costs, improve quality and uniformity of your castings. Write us today!



Typical examples of high production multiple-row blow-boxes. Ask about our advisory service on core blowing.

INDUSTRIAL PATTERN WORKS
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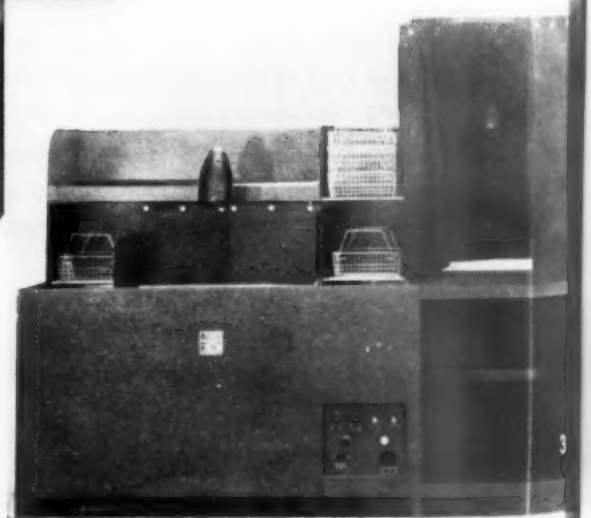
Black Light

Fig. 1—Applying fluorescent penetrant and washing. Typical operations in foundry installation of aircraft plant

Fig. 2—Inspecting a cast magnesium aircraft wheel. Large cracks shown by the fluorescent lines are not visible under white light examination without extensive microscopic aid

Fig. 3—ZA-12 Zyglo Unit



By FRANKLIN CATLIN
Magaflux Corp.
Chicago

Inspection of Castings

AN important testing and inspection method used today to reduce costs consists of Zyglo[1] with fluorescent penetrant inspection, commonly referred to as "black light" inspection. This nondestructive method of inspecting castings was used during the war when any defects had to be discovered before the part was placed in service. While there is still a pressing necessity for top quality in the castings produced today, it is equally important that inspection be utilized to reduce costs in one manner or another and assist in increasing the quality output of foundries.

Many companies report achieving economies through this method of inspecting castings. Black light inspection is used to detect porosity, fine cracks, shrinkage and other small defects which are open to the surface but undetectable with the naked eye or with a magnifying glass. Many of the newest, critical parts for jet turbines, etc. are being so inspected as a standard procedure in addition to generally established inspection procedures. Castings used for motors, washing machines, valves, etc. also are inspected by this method.

Principles of operation are extremely simple. First, the part is coated with a fluid which has properties of penetration and fluorescence and is water washable. The penetrant may be applied by dipping the casting in a tank or it may be brushed or sprayed on. The penetrant seeps into even the smallest cracks and flaws of the casting by letting the part stand anywhere from a few minutes up to an hour. Length of time required depends on the type of casting and the size of the defect. Short penetration time of only 2 to 10 minutes is required on the usual sand casting. Permanent mold or high alloy castings may require 20 minutes penetration. Furthermore, by allowing the part to stand the excess penetrant has opportunity to drain off, and be reclaimed.

After this setting period all the excess penetrant is removed, usually by washing off with clear water. A spray rinse is used, as it removes the penetrant from fillets, cavities and other depressions with greater ease. Water does not wash the penetrant out of the cracks as would be the case with some solvents which tend to mix with the penetrant and remove it from the cracks.

Parts are dried thoroughly after rinsing. This may be accomplished either by a recirculating hot air drier or a warm air blower.

A developing powder is applied after the parts have been dried. This developing powder acts as a blotter and draws the penetrant out of the cracks so that they become visible under the final black light inspection. The powder further masks any small residue of penetrant which may have remained in cavities and fillets in spite of the rinsing.

Next the part is held under the black light where the discontinuities in the casting become visible. This is accomplished in a dark booth. Cracks, pores, leakers, etc., which are open to the surface stand out as a glowing light against the black background of the booth. Sensitivity, the minimum width and size of a flaw which will be indicated by this process, is controlled largely by the

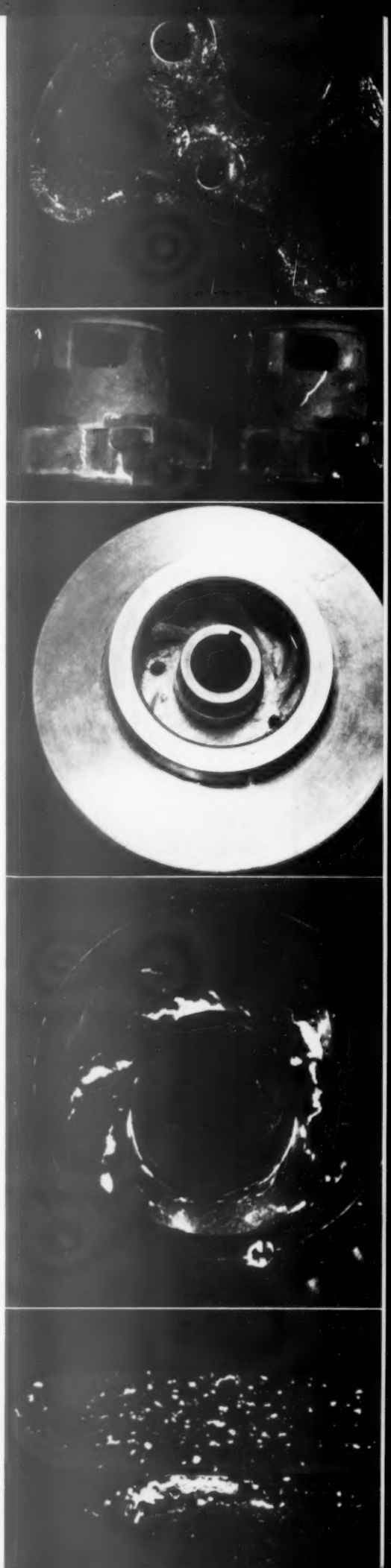


Fig. 4—Microshrinkage in sand cast magnesium airplane control quadrant

Fig. 5— Cooling cracks in cast aluminum electric motor housing due to improper heat control

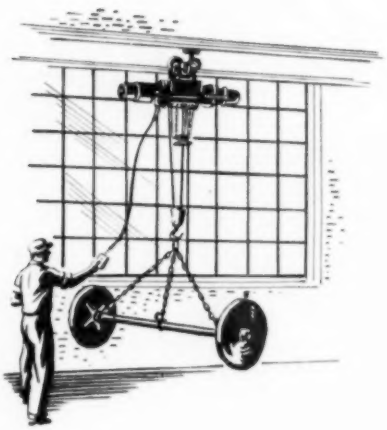
Fig. 6—View of cast bronze water pump impeller (18 in. diam)

Fig. 7— Extensive shrink crack pattern in cast bronze water pump impeller—(1) Detection saves failure in service. (2) Accurate knowledge of extent of cracking beyond one or two visible cracks allows true salvage appraisal—Is it worth chipping and rewelding this piece?

Fig. 8—Close view of shrink cracks and porosity on end of cast aluminum fitting

THEY LIFT THE SAME LOAD
BUT THEIR RUNNING COSTS DIFFER—

On the floor control, with the operator primarily occupied with other duties.



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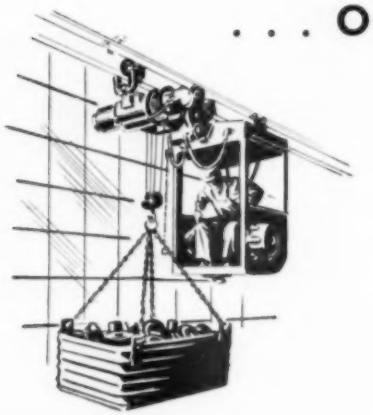

The operator in the cab, traveling loads at speeds up to 500 f.p.m. or more and occupying a better vantage point for spotting or stacking.

It's not always easy to forecast which type of service will best fill the bill.

Let the Shepard Niles specialist show you pertinent data on typical installations. He sells both types of hoist and overhead cranes as well, so he approaches your materials handling problem with an open, unprejudiced mind.

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Makes and sells all three lifting tools for airborne shop loads.

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amount of time allowed for penetration after the part has been dipped. The term black light is popularly applied to the near-ultra violet light in the range between 3200 and 4000 Angstrom units in wave length, invisible to the eye, and completely harmless to the eyes and skin under proper use.

Cleaning of the part is necessary to satisfactory operation of this inspection process. Foreign matter which clogs the surface openings of defects must be cleared away or it would retain the penetrant to the ultimate confusion of the inspector. Water easily washes the penetrant out of surface scratches and other minor surface defects.

Applied To Cast Parts

Another time-saving means of using the fluorescent procedure has been adopted in some foundries. The penetrant is applied to the cast parts immediately after removal from the sand, and after most of the sand has been knocked off. After a few minutes, the last adhering sand and the penetrant are removed simultaneously in the cleaning operation, such as blasting. Inspection under black light can follow blast cleaning directly with no added operations. In some cases use of a little developing powder improves the fluorescent indications of defects. Thus inspection is with reliability, sensitivity, and value greatly increased. Invisible cracks, which are open to the surface, are readily located.

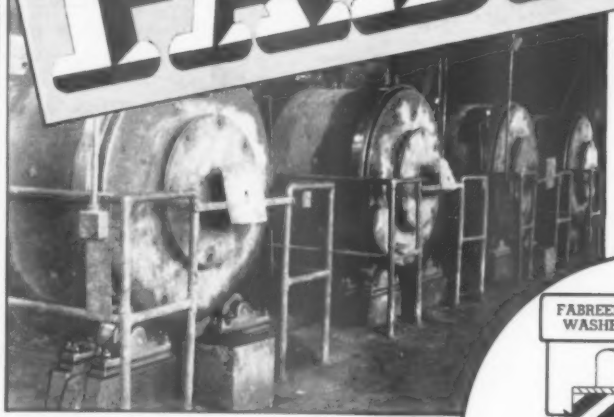
Equipment has been developed to apply this inspection in the most rapid and effective manner, from hand operated means to fully automatic conveyorized inspection units. Many foundries report their greatest benefits from the inspection of pilot castings in new lots being cast. While establishing best gating or pouring procedures it is especially important to be able to see all surface defects in the part quickly.

One type of flaw in cast aluminum is caused by uneven shrinkage of the metal upon too rapid cooling in certain areas. Shrinkage cracks show up vividly under black light inspection as broad irregular lines, or as a general area of fluorescent light. Improper design, faulty casting procedure, construction of mold, or type of metal may cause shinkage. The shrink cracks and areas of shrinkage porosity commonly come to the surface on sand castings (though often not visible), and can be detected by fluorescent inspection. This is particularly true of the light metal alloys. In heavily stressed sections cracks are defects which must be

(*Continued on page* 172)

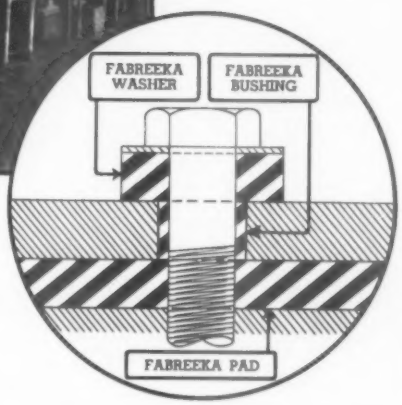
Under All Heavy Machinery

FABREEKA

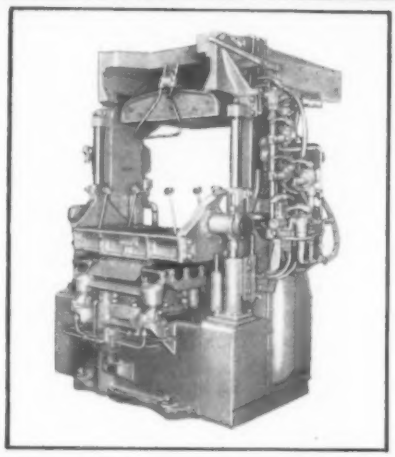


PADS, BUSHINGS, and WASHERS

Absorb Impact Shock and Reduce the Effect of Destructive Vibration

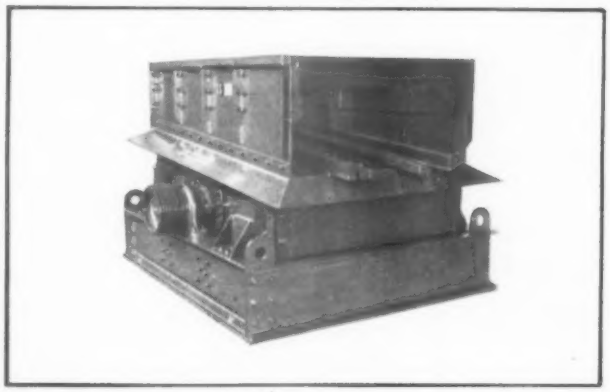


SHOWN AT LEFT
CROSS SECTION OF
FABREEKA INSTALLATION



FABREEKA Pads, bushings, and washers are installed under Shakeout Machines, Jolt Moulders, Tumbling Barrels and other heavy machinery to reduce the effects of heavy impact shocks and destructive vibration.

FABREEKA has demonstrated its ability to prevent breakage of machine parts and to keep bolts tight, thereby reducing maintenance and increasing production. In addition to these important advantages, Fabreeka has long life, which makes its final cost a low cost.



Write for latest literature

It Pays To Specify Fabreeka

FABREEKA PRODUCTS COMPANY, INCORPORATED
222B Summer Street
Boston 10, Mass.

for IMPACT SHOCK and VIBRATION

(*Continued from page* 170)

located. Shrinkage porosity shows up as a cluster of pin holes on the black background of the part. Isolated pinholes of light becoming visible under black light indicate the presence of pinhole porosity. Often these are not serious and should not form a basis for rejecting the part, unless the part is to present a mirror smooth finish after machining.

It sometimes is possible to grind away the cracks which can frequently result in substantial savings. On many classes of castings the defect can be removed and weld repairs made. After a flourescent penetrant test of the repair has been made it can be relied upon as a crack-free part, provided of course, that the part is actually in good condition. In any case, location of the defects as closely as possible to the source of trouble usually will allow for a correction of the process or step which causes trouble, thus avoiding continued recurrence. A regular sampling inspection allows control, with assurance that defective parts are not being made or shipped in any lot.

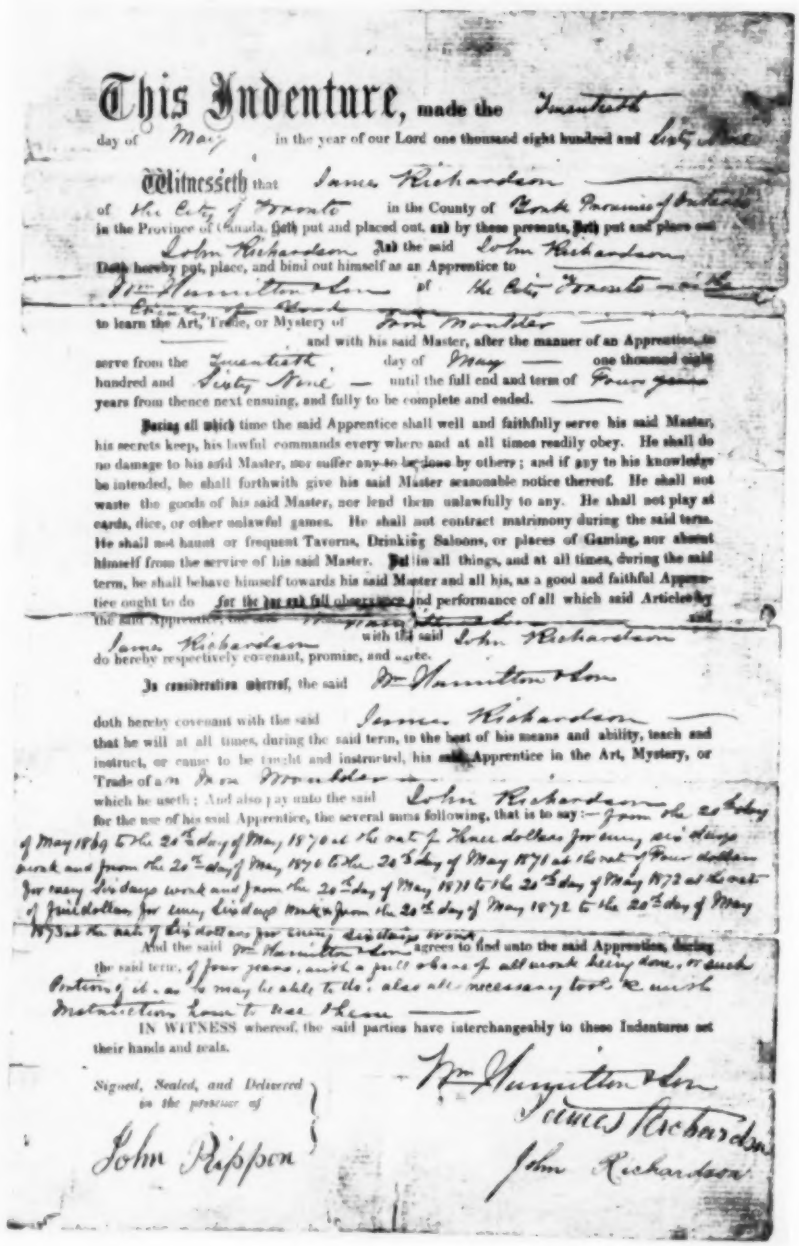
Savings which accrue through inspection of castings are well known. At one typical foundry such inspection takes place after casting, before the work is released to the machining department. At this point undesirable castings are weeded out before time is expended on machining. Corrective measures are instigated at this point if flourescent inspection determines that the defects are caused by the casting method, or in the case of a new part, by improper design or any one of a number of related factors. By correcting a fault at the source, rejects are lowered, a high quality of castings is obtained, and the cost of machining faulty castings is eliminated. During the war the Navy checked many castings 100 per cent; today only spot checks are undertaken.

Check the Finished Product

Black light inspection also is used with the finished product. When rejects are found here, a check back from the finished part, through the machining to the casting process usually will reveal the cause for the final rejection. When trouble develops intermediate checks at various points of the production cycle are indicated. Usually the defects are self-indicative, and reveal the place of their occurrence.

Fluorescent inspection is used where parts have to meet stringent service requirements and where failure in service can have dangerous conquences. During the war such inspection on many aircraft parts was almost 100 per cent. Today on many types of parts used for the aircraft, railroad, auto and other industries, 100 per cent inspection is indicated to guard against failure. Aircraft overhaul stations started to use this method of inspection with surprisingly satisfactory results several years ago. It was anticipated that oil, dirt and varnish films would obstruct proper penetration, but this fear proved to be groundless. After thorough cleaning the parts can be inspected without difficulty. Since one particular overhaul station began use of fluorescent inspection it has been able to detect minor cracks and some major service defects in castings which, with additional service, might easily have re-

(*Concluded on page* 174)



This Indenture, made the Twentieth day of May in the year of our Lord one thousand eight hundred and Sixty Nine

Witnesseth that James Richardson of the City of Toronto in the County of York Province of Ontario in the Province of Canada, doth put and placed out, and by these presents, doth put and place out John Richardson the said John Richardson Doth hereby put, place, and bind out himself as an Apprentice to Wm Hamilton Esq of the City Toronto aforesaid Founder to learn the Art, Trade, or Mystery of Iron Moulder and with his said Master, after the manner of an Apprentice, to serve from the Twentieth day of May — one thousand eight hundred and Sixty Nine — until the full end and term of Four years from thence next ensuing, and fully to be complete and ended.

During all which time the said Apprentice shall well and faithfully serve his said Master, his secrets keep, his lawful commands every where and at all times readily obey. He shall do no damage to his said Master, nor suffer any to be done by others; and if any to his knowledge be intended, he shall forthwith give his said Master seasonable notice thereof. He shall not waste the goods of his said Master, nor lend them unlawfully to any. He shall not play at cards, dice, or other unlawful games. He shall not contract matrimony during the said term. He shall not haunt or frequent Taverns, Drinking Saloons, or places of Gaming, nor absent himself from the service of his said Master. But in all things, and at all times, during the said term, he shall behave himself towards his said Master and all his, as a good and faithful Apprentice ought to do for the true and full observance and performance of all which said Articles by the said Apprentice to be kept and performed, the said James Richardson with the said John Richardson do hereby respectively covenant, promise, and agree.

In consideration whereof, the said Wm Hamilton Esq doth hereby covenant with the said James Richardson that he will at all times, during the said term, to the best of his means and ability, teach and instruct, or cause to be taught and instructed, his said Apprentice in the Art, Mystery, or Trade of a Iron Moulder which he useth; And also pay unto the said John Richardson for the use of his said Apprentice, the several sums following, that is to say:— from the 20th day of May 1869 to the 20th day of May 1870 at the rate of three dollars per week for six days work and from the 20th day of May 1870 to the 20th day of May 1871 at the rate of Four dollars per week for six days work and from the 20th day of May 1871 to the 20th day of May 1872 at the rate of five dollars per week for six days work and from the 20th day of May 1872 to the 20th day of May 1873 at the rate of Six dollars per week for six days work.

And the said Wm Hamilton Esq agrees to find unto the said Apprentice, during the said term, of four years, such a full share of all work being done, as such Apprentice shall be able to do: also all necessary tools & such Instruction from time to time as shall be meet.

IN WITNESS whereof, the said parties have interchangeably to these Indentures set their hands and seals.

Signed, Sealed, and Delivered in the presence of

John Rippon

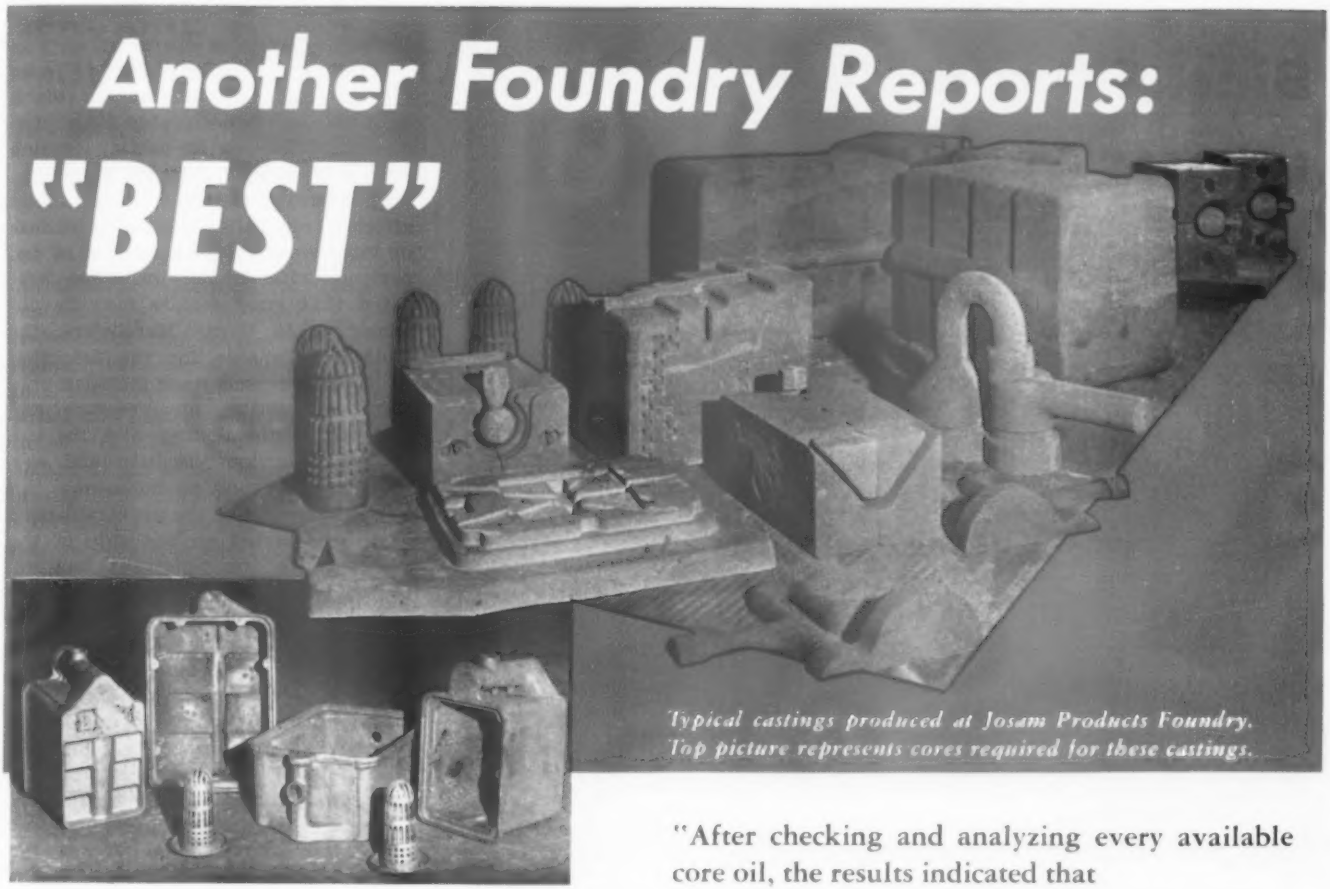
Wm Hamilton Esq

James Richardson

John Richardson

INDENTURE PAPERS: The indenture reproduced here is 80 years old and the property of George Richardson, continuously associated with Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., since 1909. The papers record the indenture of Mr. Richardson's father to "learn the Art, Trade, or Mystery of Iron Moulder," and the commitment was by Mr. Richardson's grandfather. The apprentice of 1869 bound himself to forsake matrimony and not to "haunt Taverns, Drinking Saloons, or places of Gaming," during the four years—all at a wage scale rising from $3 to $6 a week

Another Foundry Reports: "BEST"



Typical castings produced at Josam Products Foundry. Top picture represents cores required for these castings.

"After checking and analyzing every available core oil, the results indicated that

CITIES SERVICE 30 Series Delco CORE OIL *best suited our general over-all work.*

We have been using this core oil for more than two years and during this time is has given us complete satisfaction."

J. Papineau, Foundry Superintendent
JOSAM PRODUCTS FOUNDRY CO.
Michigan City, Indiana

CITIES SERVICE 30 SERIES DELCO CORE OILS

stand high in the esteem of their users, because:

- They are quick drying—save time and oven fuel.
- They are stable at extreme temperatures—always ready regardless of season or latitude.
- They show better green strength, better performance in core boxes, whether blown or rammed.

Contact local Cities Service representative for full information and assistance in choosing and applying the correct grade of Delco Core Oil for your specific requirements. This service is prompt, reliable and valuable. Cities Service Oil Company, Chicago, Cleveland, Kansas City, St. Paul and Toronto—Arkansas Fuel Oil Company, Shreveport.

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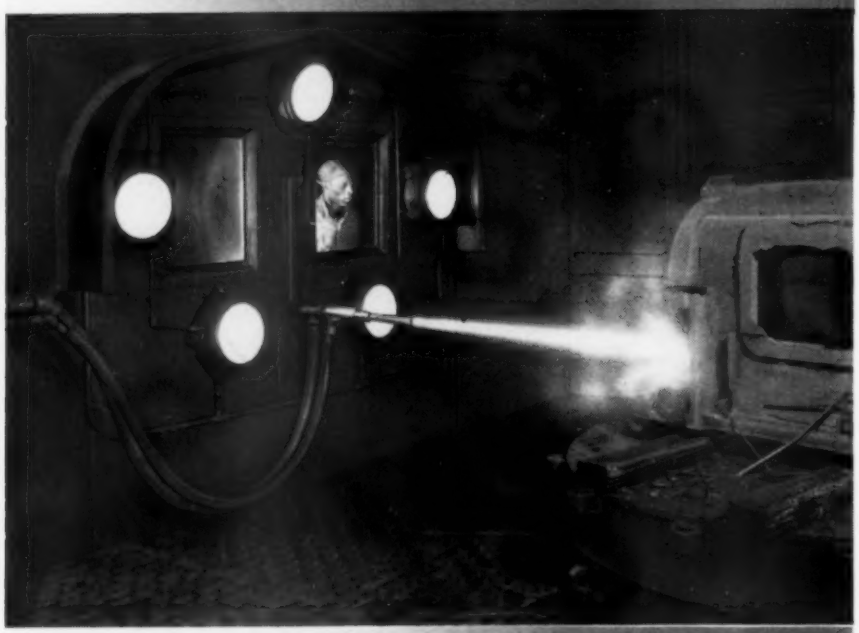
CITIES SERVICE

Blast Clean & Remove Cores in ONE operation



Pangborn Hydro-Sand Blast

Here's the economical, clean, easy, safe way to remove cores and blast clean in one operation with only one man . . . Pangborn Hydro-Sand Blast and Core Knockout.

This modern installation propells a high-velocity stream of sand and water that blasts, cuts and cleans. Work rotates on a controllable table inside a self-contained steel plate room while the operator manipulates the blast stream from outside. There's no dirt or dust. It's a cleaning room that keeps itself clean and greatly reduces dust from other operations in adjacent areas.

With this Pangborn Hydro-Sand Blast and Core Knockout, you recover core sand and reclaim core rods without sledge damage. Your subsequent roughing, chipping and finishing operations become faster, cheaper jobs because of the efficiency and thoroughness of this machine.

Hydro-Sand Blast Rooms are custom-engineered . . . tailored to your individual requirements to give you faster, better, cheaper blast cleaning. For complete information write for *free* bulletin No. 1100 to PANGBORN CORPORATION, 2300 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for all the latest developments in Blast Cleaning and Dust Control Equipment.

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

(*Concluded from page* 172)

sulted in failure in operator.

It might be interesting to note several recent applications of black light inspection, noticeably in the discovery of leakers in castings which need to withstand pressure in service. At present the method has been found effective on walls of ¼-in. thickness or less, while a lesser amount of experience with thicker walls has indicated that good results may be obtained up to ½-in. Heretofore, the methods available for the detection of leaks in vessels have included only visual inspection, air pressure and water pressure testing and the use of liquids of low viscosity and surface tension, such as kerosene.

With black light the penetrant need only be squirted on one side of the wall. Since the penetrant has excellent penetrating power it will seep through to the other side which may be inspected with the aid of a portable black light. Leaks will stand out in sharp outline. Fine pinpoints can be found with the aid of a developing powder. The color of the penetrant is important since it must contrast well with the natural green and blue fluorescence of machine oils, fluxes, etc., often found on equipment and parts. The standard penetrant gives a yellowish-green fluorescence, while a type in red is now available for special applications.

[1]Zyglo is a registered trade name of the Magnaflux Corp. for materials and equipment used with patented fluorescent penetrant methods.

Foremen To Meet

National Association of Foremen, Dayton 2, O., has planned its 26th Annual Convention, to be held in Detroit, Sept. 21 to 24, with registration at the Statler Hotel and Masonic Temple. Co-chairmen of the meeting are W. E. Landis, Briggs Mfg. Co., and Leon Cummings, Great Lakes Steel Corp., Detroit.

There will be 10 separate sectional conferences and 5 separate workshops, each repeated 4 times at the Detroit meeting. General session speakers announced so far include Alfred Haake, economist, Park Ridge, Ill., and C. A. Kothe, Kulp, Pinson, Lupardus & Kothe, Tulsa, Okla. B. A. Hodapp is president of the association.

Induction Heating Corp., producer of electronic heat treating equipment, held a demonstration of its thermionic core making process June 24, at its plant located at 181 Wythe Ave., Brooklyn 11, N. Y. Advantages and fundamentals of electronic core baking were explained.

MACHINE MOLDING STEEL CASTINGS

(*Continued from page* 85)

conditions, operation is none too satisfactory. If the board is set in level with the bottom of the drag flask, there is still a tendency for the sand in the drag to pull away from the pattern while ramming the cope. On the other hand, if the board is not so seated, the flask generally will slide down on the sand and move the joint to a position considerably above the top of the drag flask. Since a somewhat similar condition would be encountered in ramming small molds with patterns mounted on double-faced matchplates, plain jolters are not used for that purpose. Instead, for reasons which will be explained in detail later, work of this type is almost always handled on jolt squeezers.

Ram Copes By Hand

When molds are to be rammed from loose patterns on small plain jolters, the usual practice is to use the machine only for the drags, and ram the copes by hand. The latter may be made without removing the flasks from the machine table, but as this keeps the machines idle too much of the time, it is better practice to transfer the drags to suitable stands where other operators ram up copes as fast as drags are delivered to them.

Though machines with suitable pattern drawing devices are generally preferred for the purpose, plain jolters may also be used to ram up molds from medium and large sized patterns mounted on cope and drag boards, as shown in Figs. 12 and 15, the flasks being handled and the patterns drawn either by hand or with hoists or cranes.

The operation of ramming up a flask with a jolter is relatively simple. The pattern board and pattern having been set on the table of the machine, facing sand is placed over them and if necessary heaped up and packed down by hand or with the back of a shovel, to cover projecting portions of the pattern. The flask then is set in place over the pins of the board, backing sand shoveled or chuted in until it is heaped up as high as it will lie, and the jolting started. As the sand feeds down, it is spread evenly with shovels, and if necessary more is added in

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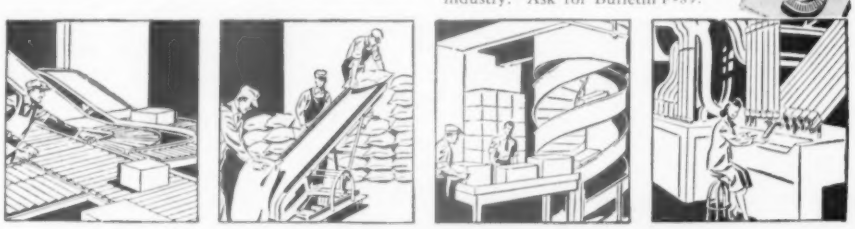


ROLLER · BELT · SLAT · CHAIN CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

order to fill the flask completely. As already mentioned, a loose frame sometimes is set on top of the flask proper to pile the excess sand higher and thus get a more thorough ram. When the sand is well compacted, in the case of a drag flask with bottom board being rammed up, the excess sand is struck off and the board is set on and clamped in place. When copes are being made, the extra sand is "butted off" between the cope bars with hand or air rammers.

When gaggers used in the copes are not hung over the bars, so that they are free to move with the sand, they are likely to work their way down through the facing as jolting proceeds. Those that come in contact merely with the pattern board may be left as they are, but the ones that are over the pattern itself must be driven back into the sand by the finishers. Sand is of course rammed into the spaces so left and slicked down with the trowel. If these gaggers are not thus driven back into the sand of the mold, they will stick to the casting, and sometimes cause hot tears in it.

In modern foundries, bottom boards are not used on medium sized and large drag flasks that are rammed up on jolters. Instead, heavy grids such as those described in the preceding chapter either are cast integral with the flasks, or are bolted securely to them. The grid bars may extend some 5 or 6 in. into the flask, or be set on top of it, and as they run both lengthwise and crosswise, they enclose a number of openings some 5 or 6 in. square or even larger. In filling the flask, sand passes readily through these openings, and when jolting is completed, it is "butted off" between the bars just as in making copes. This saves the time ordinarily required to smooth off the sand in the drag before setting on the bottom board. In using boards, it is necessary to level the sand in this way, so that the board will bear evenly on it. If this precaution is not taken the board will press too hard on some part of the sand, and when the clamps are tightened, that part will be pushed out of place and spoil the joint of the mold.

When the pattern board is set directly on the table of a jolter, and the flask in turn rests on the board, the latter is subjected to heavy wear from the impact of the flask in jolting. To minimize the damage from this source, wooden boards are usually reinforced at the edges with heavy metal strips wide enough to support the flask, or with metal plugs driven into a row of holes near the edge of the board. Though quite satisfactory for small machines, these measures are not completely effective for heavy equipment. A better arrangement for large jolters is to set the pattern board in what is known as a well-board, Fig. 14, which is mounted on the jolter table, and completely covers, or even somewhat overlaps it.

Seat the Pattern Board

This "board" is a heavy steel plate with a flat bottom, and a recess on the other side, in which the pattern board is seated so that its upper surface is level with the top of the well-board. If a sand joint is desired, of course, it should be a little below that level. The flask rests upon the well-board, and should preferably be as large as the pattern board, or even a little larger, so that none of its weight is carried by the latter. The guide pins in this case must be set in the well-board instead of the pattern board in order to engage the holes in the flask. By using this arrangement, the pattern board carries only the weight of the sand in the flask.

The pattern itself if possible should not overlap the pattern board and rest partly on the well-board, because then it is likely to be broken unless it rests evenly on both. A small overlap is sometimes permissible, but not desirable.

In order not to reduce too much the weight of flask, sand and pattern that the jolter will lift, the well-board should be as light as possible. To secure the maximum saving in weight without undue loss of strength, large well-boards are built with a heavy outer frame, tied across the central recess by stout ribs, deep enough to contact the table of the machine and the bottom of the pattern-board, and thus firmly support both pattern board and flask.

Copes, if shallow, usually are lifted off the well-board just as if only a pattern board were used. In handling drags, or very deep copes, they are generally clamped to the well-board and lifted off the machine with it. The two are then rolled over with the crane and unclamped, the well-board lifted off, and the pattern and board drawn from the sand with the crane or hoist as shown in Fig. 16 .

When large copes are to be ram-

(*Continued on page* 178)

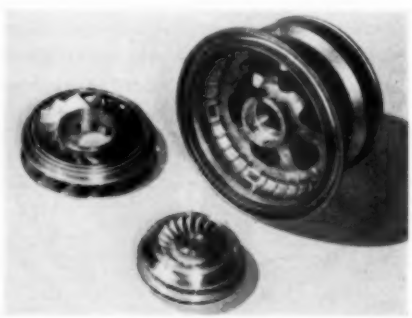
Develops Plaster Molding Technique

CASTING of shrouded, high speed impellers in one piece, with close control of critical dimensions and surfaces so that machining and balancing are practically eliminated, is claimed for a new process recently developed and introduced at the Teterboro, N. J., foundries of the Eclipse-Pioneer Division, Bendix Aviation Corp.

Using plaster mold casting technique, the new process not only is adaptable to mass production requirements, but, at the same time, can be used to turn out parts with complex inner construction; will consistently maintain critical uniformity and wall thickness; and is capable of producing satin-smooth finishes, wherever desired, on either internal or external surfaces. Since much of the machining and in some cases all of it, is eliminated, complex parts previously cast in sections so that inner surfaces could be machined, can now be cast in one piece with considerable saving in time, labor and material.

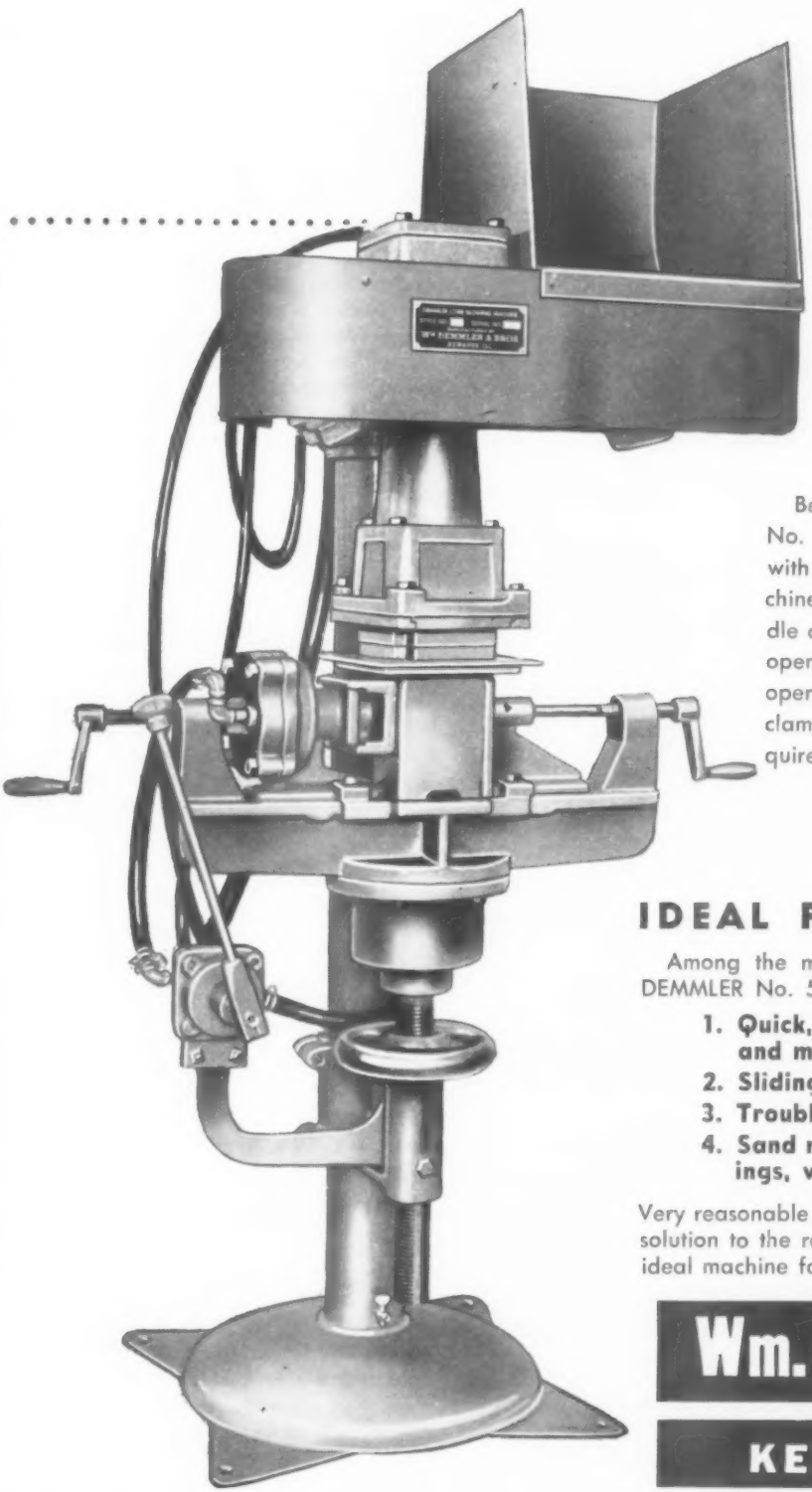
Ability to produce thin, reinforced walls gives the process the added advantage of weight saving without loss of strength. Eclipse-Pioneer foundry engineers claim an increase in structural strength and point to improved performance of such parts as impellers where peripheral speeds up to 1500 feet per second generate tremendous centrifugal forces.

The particular technique of plaster mold casting, resulting from six years of development and research by the company's metallurgists and methods engineers, is said to be applicable to all nonferrous metals on a mass production basis. It affords an accuracy and quality heretofore achieved only through precise tooling and reduces costly machining, balancing and finishing to a new low.



Types of aluminum castings produced by plaster molding technique. Upper left is a turbine for a torque converter unit; upper right is a 10-in. airplane landing wheel, and center is 6-in. two-stage shrouded impeller. Photo by Eclipse-Pioneer Division, Bendix Aviation Corp.

DEMMLER Core Blower NO. 55



A FAST CORE BLOWER EVERY FOUNDRY NEEDS AND CAN AFFORD

Because of its many features, the new Demmler No. 55 Core Blower was quick to gain popularity with foundrymen everywhere. This versatile machine will accommodate boxes 9 inches long—handle cores weighing up to 3 pounds. Sand magazine opening is 4½ by 9½ inches. A single hand valve operates both vertical and horizontal core box clamps and blows the core. Only 3 seconds required for complete cycle!

IDEAL FOR SHORT RUN JOBS

Among the many high quality features found on the new DEMMLER No. 55 are:

1. **Quick, easy adjustments for raising the table and moving chuck jaws.**
2. **Sliding, quick change blow plates**
3. **Trouble-free diaphragm type blow valve**
4. **Sand magazine and carriage of aluminum castings, with ball bearing rollers**

Very reasonable in price, the DEMMLER No. 55 is the economical solution to the rapid production of high quality small cores—an ideal machine for any foundry whether larger or small.

Wm. Demmler & Bros.

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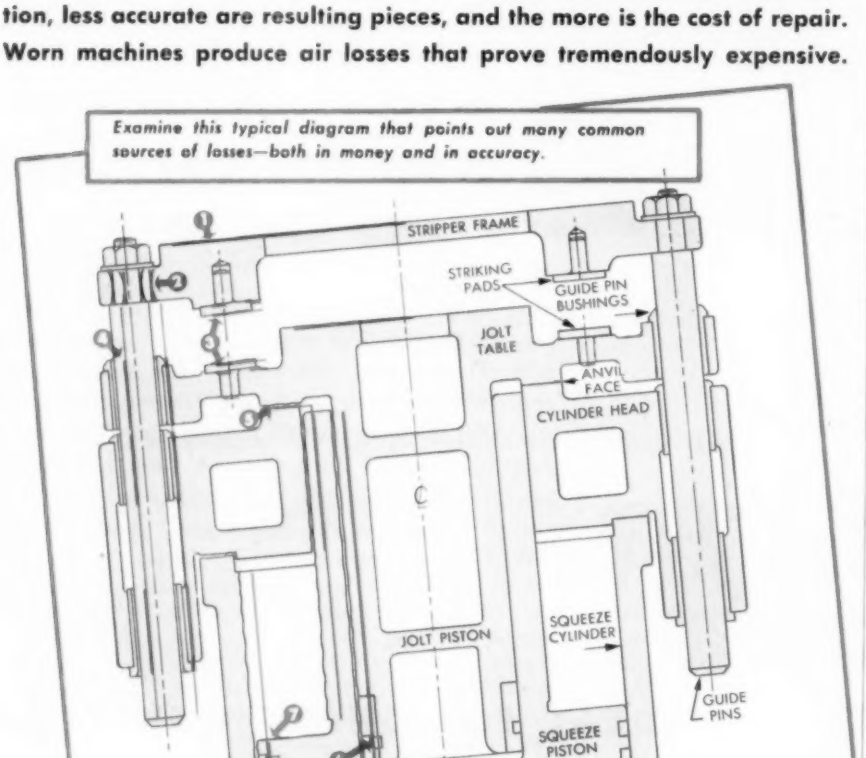
NOW— A MOLDING MACHINE REBUILDING SERVICE

SAVE MONEY!

Stop operating your machines with worn parts! Stop making scrap: increase your yield from same equipment.

The longer you put off correcting this condition, the faster the parts wear; the greater is the loss of production, less accurate are resulting pieces, and the more is the cost of repair. Worn machines produce air losses that prove tremendously expensive.



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2. WORN PIN PILOTS
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MACHINE DIVISION

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(*Continued from page* 176)

med, the job of placing gaggers and facing sand consumes a great deal of time, and even spreading the sand on a deep drag pattern often requires five minutes or more. To secure maximum production from the jolter, therefore, facing should be placed, the gaggers set and the flasks filled with backing sand, at a station near the machine. The assembled jobs are then moved to the jolter table and rammed one after the other. With a few men handling the machine and two or more gangs setting up patterns and flasks, a high rate of production can be maintained without difficulty.

Jolters of the very largest size are built with mechanical flask handling and pattern drawing devices, because the flasks rammed on them are so large that the cost of the necessary equipment would be prohibitive. Instead, overhead cranes are used to move flasks and patterns to and from the machines, and to draw the patterns. In operating small jolters, the light flasks and core boxes used are often moved and rolled over by hand or with light hoists, especially if the patterns are not mounted on cope and drag boards.

Patterns Mounted on Boards

To secure the maximum production from jolters of any but the smallest and largest sizes, however, mechanical pattern drawing devices are as a rule either incorporated in them, or mounted on the same foundation and operated as if they were integral parts of the machine. Roll-over pattern devices are used on machines handling flasks as large as 8 x 12 ft, weighing 30,000 lb. Patterns mounted on cope and drag boards, of course, are used in connection with this equipment. Depending upon the conditions to be met, the flask may be raised straight up off the board and pattern by what is called a "pin-strip" device, Fig. 20, or board, pattern and flask may be lifted and rolled over, and the flask drawn down from the pattern.

For drags, which have to be turned over anyway, the latter method is usually preferred, while small and medium sized copes that do not require patching or coring up are often handled on pin-strip machines. These usually have four stout power-driven pins that engage the corners of the flask and raise it off the pattern plate. To help hold the sand in the flask when drawing a deep pattern, a "stripping plate" may be used. This is a stiff metal plate set between the flask and the pattern board, and cut

(*Continued on page* 180)

For LARGE Jolt - Rollover - Draw Work

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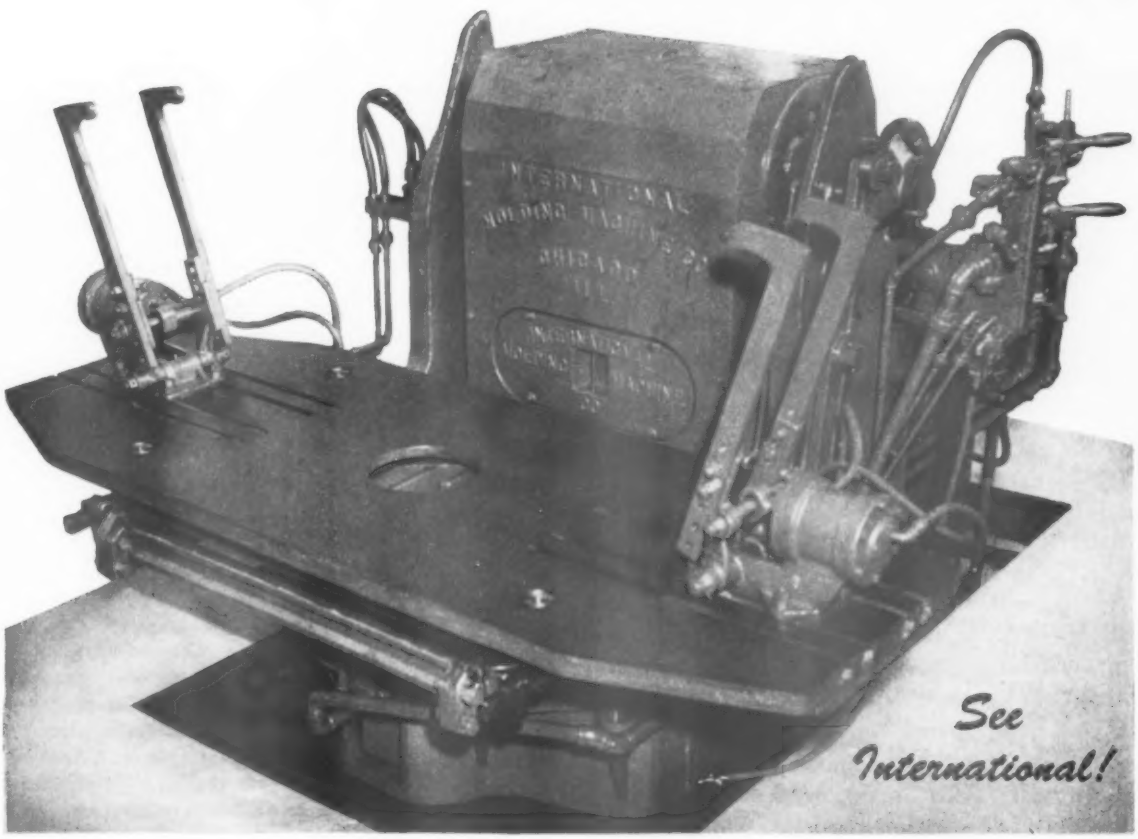

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(*Continued from page* 178)

away in the middle to allow the pattern proper to extend through it. The pins of the lifting device engage the stripping plate instead of the flask, and raise both away from the pattern. The flask is then lifted from the stripping plate and set down.

Certain pin-strip machines also are furnished with lifting frames, Fig. 19, that rest on the jolter table and carry the flask. The pattern plate is as usual mounted directly on the table and clamped or bolted down to it. The pins engage the lifting frame and raise it with the flask, leaving the pattern board behind. If necessary, a stripping plate may be set between the flask and the lifting frame, to prevent the sand from falling out during the draw. When these frames are used, they provide a true bearing for the pins, and a straight draw is secured, which is not always possible when the pins engage the flask itself. Flasks, of course, are likely to get bent and distorted in knocking out the castings and in handling and then the lifting pins do not engage them properly, so that as the flask is raised, one corner will lag behind the rest. Such a condition usually produces a bad draw and a mold that requires a lot of patching, or may even have to be knocked out. Lifting frames reduce this difficulty to a minimum.

Use Rollover Devices

When the impressions in the cope sand are of moderate depth, copes usually will lift off the pattern with little if any damage to the mold. This is especially true in small and medium sized machines on which it is possible to use stripping plates. In lifting deep copes of larger size, the sand often will not part from the pattern perfectly and will break off here and there, so that the mold requires considerable patching. These big deep copes, therefore, are better handled by rollover drawing devices.

To a certain extent, the same is true when very large molds are served by the overhead crane, as a better draw can usually be secured by rolling the cope over and lifting the pattern out of the sand than by raising the flask off the pattern. To insure a good draw on a very deep pattern, turn buckles sometimes are placed between the pattern lifting hooks and the sling chains of the crane, the crane hook is well centered over the flask, and the turn buckles are adjusted until all the chains are equally tight. The pattern is then rapped, and with a man at each chain, the turn buckles are revolved evenly and steadily till the pattern is

loosened in the sand. Once the lift is well started, the crane raises the pattern straight up until it is clear of the mold.

The roll-over pattern drawing devices usually have a pair of power-operated arms carrying a heavy plate to which the pattern and pattern board are clamped. This plate in turn rests on the jolter table, with the flask upon it, while the mold is being rammed. When that operation is completed, the flask is clamped to the plate, and the arms lift pattern board and flask, move them forward and turn them over, on the side of the machine opposite to the ramming table. A platform that is moved up and down by an air or hydraulic cylinder and piston then is raised until it supports the flask, whereupon the clamps are released, a vibrator on the pattern board is started up, and the mold is lowered away from the pattern by dropping the platform. It should be moved slowly until the sand grip on the pattern is broken, then more rapidly. The flask usually is pushed on to a roller conveyor, by means of rollers on the platform, but sometimes, it is lifted by the overhead crane and set down where it is to be finished and closed.

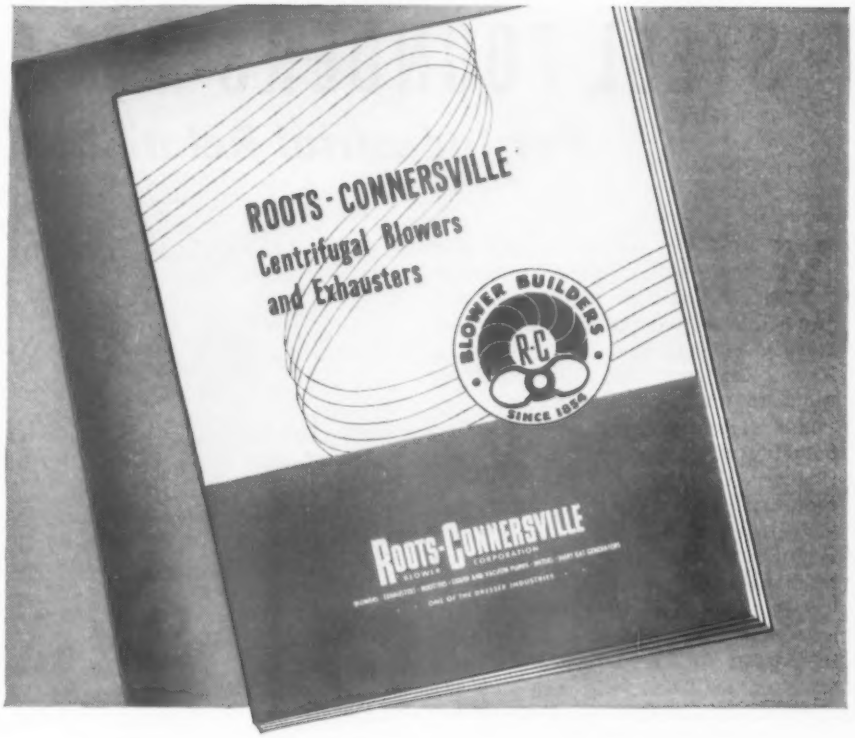
Draw The Pattern

In another type of machine, the pattern board and flask first are raised straight up and rolled over, and then lowered till the flask rests on a car running on a pair of rails, one on each side of the jolter table. The clamps holding the flask to the board are then released and the board is lifted until the pattern clears the sand. When the mold has been moved away on its car, the pattern board is rolled over again and lowered to its original position on the jolting table. The makers of this machine claim that it gives a better draw.

Cores made in boxes with one open side, and so shaped that they can be made on a jolter, are handled readily with roll-over and draw attachments on the machine. The box is bolted down on the plate of the roll-over device, filled with sand and jolted. A drying plate is then set over the finished core, and clamped to the box or to the plate of the roll-over attachment. Box and plate are rolled over, the plate unclamped, and the core on its plate is drawn down from the box, which is then rolled back into position on the table of the jolter, ready to make another core.

(To be continued next month)

Sources of Illustrations
Figs. 12, 14, 15, 16—General Steel Castings Corp.
Fig. 17—Harry C. Coffey.
Fig. 19—Osborn Mfg. Co., Cleveland.



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STEEL FOUNDERS MEET AT CHICAGO

For Industrial Relations Conference

By FRANK G. STEINEBACH
Editor
and
HOWARD C. TUTTLE
Chicago Editor
THE FOUNDRY

METHODS for developing and maintaining good industrial relationships featured a two-day conference of the Steel Founders' Society of America, at the Drake Hotel, Chicago, June 9-10. More than 160 top executives and personnel directors of the steel foundry industry attended the meeting.

Harry L. Simmons, personnel director, Scullin Steel Co., St. Louis, and chairman of the personnel committee of the SFSA presided at the first session. In opening the meeting, Mr. Simmons stated that problems of industrial relations have held increasing interest during the past few years. Today we are not interested in how we may return to industrial relations standards of past periods, but in the kind of a system of industrial relations we desire to establish for the present and for the future. Mr. Simmons emphasized that employees have many interests in common with management, and that employees stand to gain with every important improvement in sound managerial principles.

Steps To Increase Profits

Thomas H. Shartle, president, Texas Electric Steel Casting Co., Houston, Tex., and president of the SFSA, recommended four steps that should be taken to increase profits. These include the following: 1. Installation of major work standards with incentive pay; 2. Development of a good, sound job evaluation program; 3. Providing a sound salary evaluation program; 4. Doing a better job of intelligent collective bargaining.

In an interesting paper entitled, "Developing a Medical Program for an Average Size Foundry," Robert G. Scott, director of personnel and safety, Commercial Steel Casting Co., Marion, O., emphasized the fact that values obtained more than offset the actual cost of the operation. Mr. Scott stated that a program is necessary for three reasons, as follows: 1. To insure, as far as possible, that the people employed have the physical ability to perform efficiently the work required of them without harm to themselves or others; 2. To prevent acceptance of liability for physical conditions existent at time of employment, which later may be construed to be, or result in cases for industrial compensation; 3. To maintain and prolong the productive efficiency of employees, to the advantage of both industry and the individual.

Mr. Scott emphasized that there must be a doctor to head the program. Inasmuch as the average foundry has no need, and cannot afford a full time doctor, this person will be on a part time basis. Every effort should be made to get a doctor who is interested in this work and will acquaint himself with the operations and problems of the foundry industry. Above all, he must realize that his attitude, and his actions have an important bearing on the relation between labor and management. Whether he considers himself closely connected with the company or not, the employees most certainly will do so, and their opinion, good or bad, is going to be reflected on management.

The nurse is one of the most important cogs in the medical program. Her duties are varied and her responsibilities great. The nurse sees more employees more often than any other person in the plant, even the grievance man. Her attitude and her judgment are going to affect greatly the medical and safety programs, and the labor-management relations.

Mr. Scott discussed the importance of adequate first aid facilities, the pre-employment and periodic physical examinations, the program of follow-up and the importance of complete honesty and frankness in the administration of a medical program.

Daniel E. Kemper, director of personnel, General Steel Castings Corp., Granite City, Ill., presented a paper, "Relation and Functions of a Safety Program in Plant Operation," in which he discussed the operation and success of the safety work of his company. It is the belief of that company, based on experience, that a foundry can be maintained in a clean and orderly manner. In any program, Mr. Kemper believes it important that the company maintain a strong safety department led by men with knowledge, ability, and unusual qualifications for inspired leadership. The plant must be definitely organized for safety, and the foremen must have a part in the program. Top management must have the correct attitude toward the safety program and supervisors must be told their obligation and responsibilities in seeing that the safety work is carried through. Supervisors must wear the same protective equipment as the men.

Mr. Kemper described the safety contests which his company has carried on between the Eddystone and Granite City plants, and indicated it has been an important factor in strengthening the entire safety program. In conclusion, the speaker stated that an intelligent safety program can do much to create a better understanding between employees and management.

Proper Ventilation Needed

In the third paper of the morning session, W. J. Hebard, personnel director, Continental Foundry & Machine Co., East Chicago, Ind., discussed "Preventive Measures." Mr. Hebard stated that proper ventilation can do much to keep down atmospheric dust to safe limits, but that there are some operations which are considered dust producers where ventilation may not be sufficient. He stated that spraying is being used effectively as a supplement to ventilation in such areas as the shakeout. Use of respirators in dust areas appears to be the best preventive, except for the difficulty in getting men to use these devices.

His company has been using aluminum therapy as a preventive for silicosis for the past 4½ years at both the Pittsburgh and East Chicago plants. Mr. Hebard stated that while nothing has been proved from the strictly scientific standpoint, results have been encouraging. At one plant, where comparison with men taking the treatment and those not taking the treatment was possible, those under treatment showed up to advantage. The greatest surprise was in the desire of most employees to be given this treatment.

To establish sound relations with employees requires strong belief in the importance of these good relations, Dr. Robert K. Burns, executive officer, Industrial Relations Center, University of Chicago, told the Thursday luncheon session, with Leon J.

(*Continued on page* 184)

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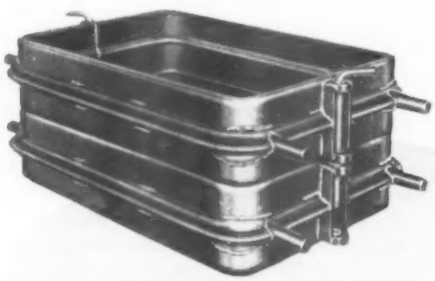

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(*Continued from page* 182)

Wise, general manager, Allied Steel Castings Co., Chicago, presiding. While management operates in two fields—that dealing with physical properties and production and that pertaining to people—the latter requires much more skill and its problems are not so easily solved or its progress measured, according to Dr. Burns.

Objectives of sound employee relations include these factors: Goals, which include recruitment, improved productivity, and reduced turnover; policy; procedures; schedules; and evaluation of the program's effectiveness. The recruitment point, he said, is most vital, and increasingly takes into account a person's aptitudes, abilities and motivation, which are important guides to a person's success and happiness in the job. Hand in hand with evaluation of the person is evaluation of the job to determine its requirements, environment, and compensation, not only in relation to other jobs within the company but also in relation to jobs within the community.

The sound relations program includes methods for learning of dissatisfactions and correcting the causes as they occur. People need means for personality development. When the management structure fails to provide stepping stones upward, often the union structure provides this outlet for more power, prestige, and greater responsibility. Aiming most of his remarks at management's relations with white collar workers, Dr. Burns cited the growing importance of union activities among this formerly unorganized worker group.

STEAM FITTING: Babcock & Wilcox Co., New York, is casting six Y-branch castings specially designed as part of the connecting header between boilers and turbines for plants of American Gas & Electric Co. The Y-branch is part of a welded steel assembly which comprises the main steam outlet header of more than 40 ft overall length. Each header was designed for an internal pressure of 2300 psi and must be constructed to withstand hydrostatic test pressure of 3450 psi. The Y-piece is cast from chrome molybdenum steel and is approximately 4 ft long with its main stem 18 in. in diam and 3½-in. thick. The two outlets are 14 in. in diam and 3 in. thick. For reinforcement in cooling during fabrication, the angle between the branches was made 4 in. thick

Speaking on "A Practical Evaluation of Industrial Relations—Increasing Man-Hour Productivity," Albert Ramond, Albert Ramond & Associates, Chicago, said good industrial relations, high man-hour productivity and low costs accompany each other. Estes M. Kimbrough, personnel manager, Symington-Gould Corp., Depew, N. Y., presided.

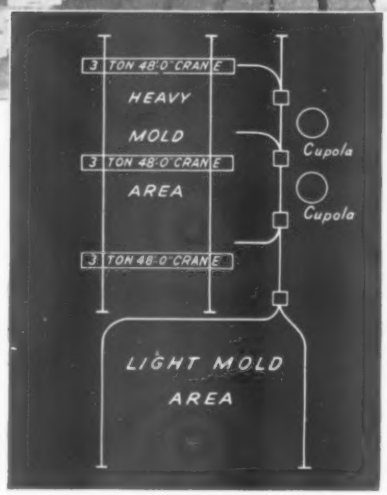
At the present time, Mr. Ramond said, we have unsound industrial relations policies that have carried over from the war period when industrial peace was worth virtually any price. Two adjuncts to the industrial relations program can do most toward improving this program, he asserted. These are job evaluation and job incentives. To get a fair day's work for a fair day's pay requires the following: (1) Proper wage determination; (2) Wage level at least on a par with other companies within the industry and within the community; (3) All jobs covered by proper standards; (4) Means for encouragement of good work. The only real test of a good job evaluation method is whether it works two ways. On only very few occasions has management been able to sell workers on the idea of accepting lower rates because the job is shown to be worth less. However, this must be done if evaluation is properly conducted. Talking about incentive pay, Mr. Ramond explained how normals can be set which will give proper pay for good work, while paying extra for better than good performance. No greater incentive than 30-35 per cent should be established, he added, because over-incentive may be injurious to the workers health and safety.

Survey Fringe Wages

F. Kermit Donaldson, SFSA executive vice president, presented the results of a survey on fringe wage payments. Costs of the many types of social welfare benefits were presented as high, low and average figures for 73 steel foundries, employing 33,000 employees, which responded. These were broken down into the various geographical districts and then by the individual benefits which were paid per hour during 1948.

Two types of standards which should be used to determine performance were described by H. G. Melia, personnel director, Dayton Steel Foundry Co., Dayton, O., under the heading "Setting up the Standards and Measuring the Results." One of these is used as a basis for incentives, the other as a measure of management's effectiveness. The management standard is by necessity only

(*Continued on page* 186)



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(*Continued from page* 184)

approximate, but can be based on certain past periods in which it is believed the highest efficiency was attained. The programs that brought about this high efficiency should be reviewed and the principles that worked at that time should again be brought into use. A management standard can be used on a trial basis until it proves its merits or is abandoned in favor of a better one. This type of measurement of company performance must have the full cooperation of all management, and in fact the more people who take part in its routine the more successful it will be, he declared.

Banquet speaker Thursday evening was Sen. Wayne L. Morse whose discussion of "Current Labor Legislation" touched on the economy issue and its tie-up with the present tax structure. He advocated the tax revision program offered by the Committee for Economic Development and of the Hoover Commission Report, and asserted the CED tax program would unfreeze venture capital and eliminate inequities from the present structure.

Friday morning was devoted to discussions on recent legislation which pertains to labor matters, with J. R. Patterson, vice president, Mackintosh-Hemphill Co., Pittsburgh, presiding. Lee C. Shaw, Seyfarth, Shaw & Fairweather, Chicago, reviewed the progress of the administration in efforts to repeal the Taft-Hartley law.

Explains Administration of Act

Victor Einach, field representative, New York State Commission against Discrimination, Buffalo, outlined the features of the nondiscriminatory law and explained how the act was administered. He stated that while any person may file a complaint, it must be signed and sworn to, and this causes many to drop the entire matter. After a complaint is received, the commission investigates the fact and if it finds evidence which is considered probable cause for discrimination, an attempt is made to correct the situation by conference, conciliation and persuasion. In four years with between 1500 and 2000 complaints handled, not one has gone beyond the stage of conference, conciliation or persuasion. However, the law does have teeth and if necessary the commission can issue a cease and desist order if the employer is not willing to co-operate. If this does not solve the problem, the matter can be taken to court.

The law also makes broad provisions for general education, working through community advisory committees. In conclusion, Mr. Einach

indicated that the law is experimenting with a new field of human relations and that a very good start has been made.

In a third paper, Earl R. Bramblett, labor relations division of personnel staff, General Motors Corp., Detroit, gave an interesting discussion on the steps followed in preparing for negotiations.

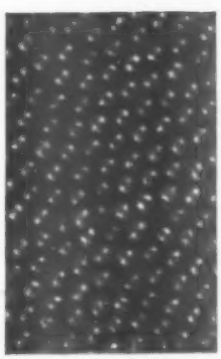
Presiding at the Friday luncheon, G. Clymer Brooke, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and vice president and executive committee member of the society, presented an interesting summary of current business conditions and trends as directly related to the steel casting industry. As in the instance of other discussion leaders during the two-day meetings, he emphasized the need for advancing sound and practical industrial relations practices as one of the key means of implementing creditable management policy and assuring satisfactory operating procedures, mutually advantageous plant relationships, and adequate return on investment and effort.

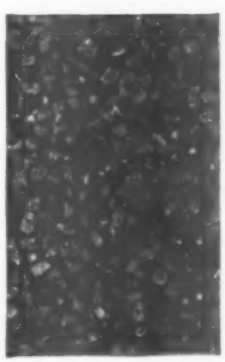
Stresses Art of Living

Principal speaker at the luncheon session was Dr. F. G. Barr, vice president in charge of industrial relations, National Cash Register Co., Dayton, O. Outlining "The Functions of the Personnel Department," he imparted to the discussion a warmth of anecdotal humor and human feeling which lent provocative understanding of the serious topics which were the prime concern of his address and the overall conference.

"The art of living, while making a living," Dr. Barr said, "is the theme of any and all personnel work that really works. It's as simple as that—although certainly not so simple to achieve and satisfactorily maintain." Satisfactory human relationships, sincere person-to-person contact, and genuine mutuality of understanding, he described as being essential to the success of any personnel program, and fundamentally more important and unavoidably necessary than any policies or procedures which seem perfect on paper but fail in the day-to-day test of human realities, in the making of castings or cash registers.

Stressing the importance of "communications," conveying information and understanding by every practicable means, Dr. Barr listed the following as necessary ingredients in any prescription for good industrial relations: 1. Foster areas of common interest, encouraging both management and employees in practice of "the art of living together satisfactorily"; 2. Develop mutual under-





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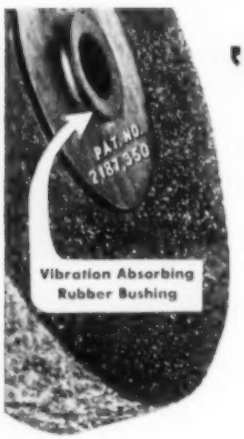
Main Office and Plant: 887 East 67th Street, Cleveland 8, Ohio

Howell Works—Howell, Michigan

Abrasive Wheels with "Shock Absorbers"... Manhattan V.D.B. Wheels



The Vibration Dampener Bushing in Manhattan Abrasive Wheels for portable grinders is a boon to man and machine. This patented center core of rubber absorbs the chatter of high-speed grinding, saves wear and tear on the worker's wrists and arms. This means many hours more of effective production, fewer hours lost through fatigue.

Costs are lowered still further because both the wheel and portable grinder last longer. The V. D. B. Wheels permit consistently higher standards of quality, too.

The Manhattan V. D. B. Bushing and Wheel are sold as a unit in straight types up to 8" in diameter.

ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive & Diamond Wheels • Bowling Balls

standings: Meaning understanding between management people, first, as to intentions and objectives; and between management and employees, secondly; leading to "broader understanding together," more respect, and more patience, one with the other.

In conclusion, Dr. Barr said that reactions are more important than facts—understanding and acceptance, or rejection of a principle more important than its actual significance in a plan. Good humor, is the key opening the door to good relations, and procrastination is a frequently overlooked virtue. Personnel men too frequently try to settle everything at once. They should be guided by admiration, rather than disgust and then personnel relations becomes fun, and fun means understanding, and understanding means success.

After luncheon Joseph S. Whiteside, New Haven, Conn., discussed "Interpretation of Contracts and Recommendation for Same," with Arthur W. Libby, Falk Corp., Milwaukee, presiding. Mr. Whiteside indicated that in all negotiations accurate notes should be kept but stenographic reports or recordings may not be advisable. Contracts should be in plain language easily understood by both labor and management.

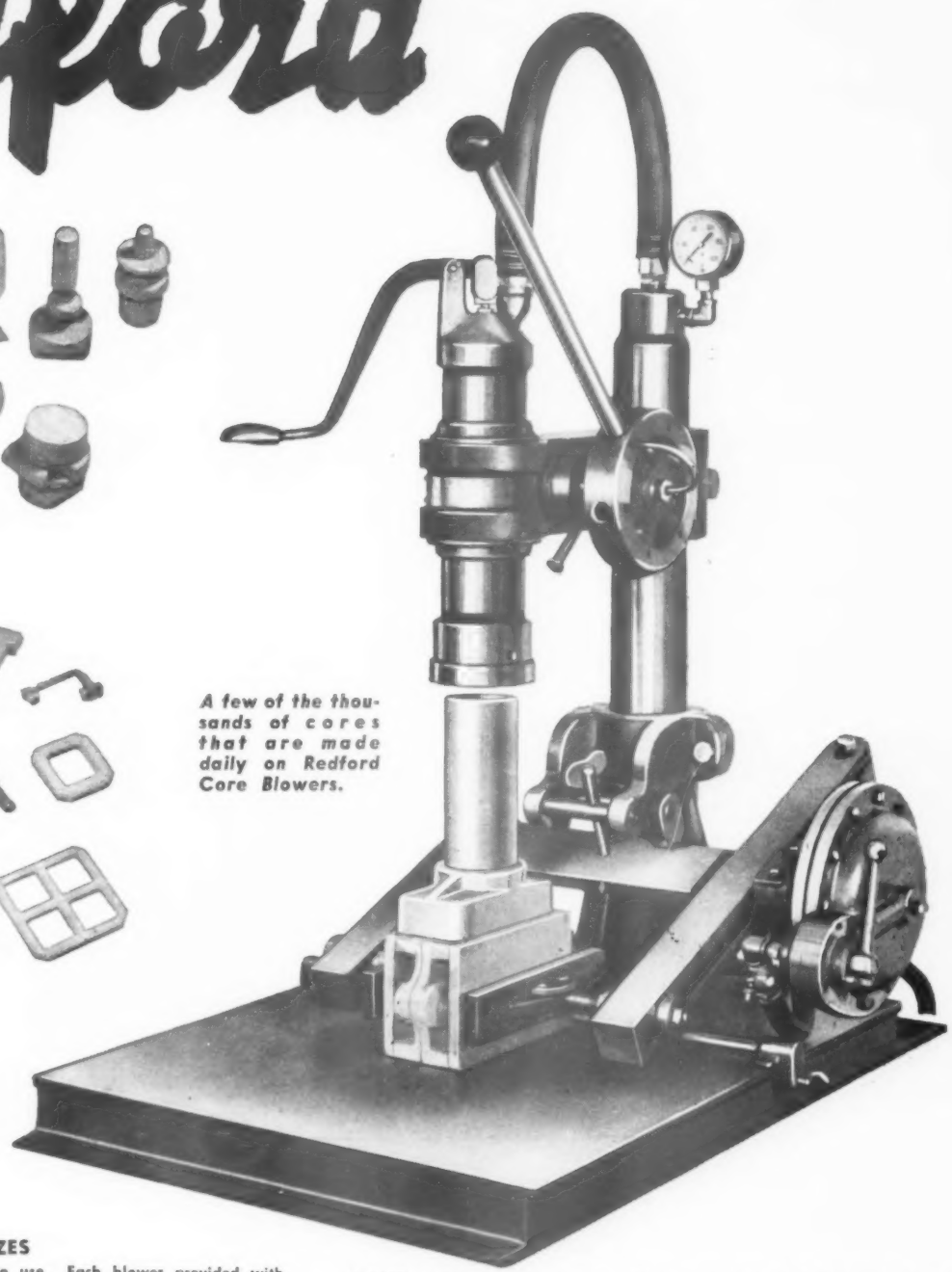
Established Safety Policy

E. F. Chittenden, director of industrial relations, Unitcast Corp., Toledo, O., discussed "Recommendations for Establishing Company Policies." The speaker placed particular emphasis upon the establishment of a safety policy by his own organization which has resulted in an improvement in the safety record. The policy is a voluntary one with no rules and every individual is answerable to himself for safety. Efforts have been made to establish facilities for employee safety education. It has been found that safe practice principles are accepted much better when they come from another employee than from a supervisor.

Aside from the comprehensive field of subject matter covered in the various papers and panel discussions during the two-day conference, many of the management and personnel executives found particular interest in the special display of personnel forms and company pamphlets arranged for the meeting. Representing an industrywide cross-section of such literature, the display was arranged by R. W. Anderson, American Steel Foundries, Verona, Pa. The conference was arranged by the society's national personnel committee, of which Harry L. Simmons, personnel director, Scullin Steel Co., St. Louis, is chairman.

Redford

CORE BLOWER CARTRIDGE TYPE



A few of the thousands of cores that are made daily on Redford Core Blowers.

SAND CARTRIDGES AVAILABLE IN 12 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in eleven additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS

PROVEN—Hundreds of foundries are using Redfords as an efficient low cost means of producing small cores. The high percentage of reorders we receive proves that Redfords are profitable to own.

SIMPLICITY—The Redford reduces core blowing to its simplest form. Anyone can understand—operate and maintain it.

SPEED—All the work of handling core box and driers is done on the machine. Cartridges can be quickly loaded by hand. As many as 200 boxes are being blown and drawn by one operator in one hour.

FLEXIBILITY—With a Redford you can make any number of different cores without loss of time for changeovers. Here is what a large jobbing foundry has to say: "We are using 7 Redfords. Your development of the portable cartridge which can be made a part of the core box equipment, has given us all the advantages of core blowing without loss of flexibility so essential to us."

Redford IRON & EQUIPMENT CO.

PHONE: KEnwood 1-8611

20733 GLENDALE AVENUE • DETROIT 23, MICHIGAN

By PAT DWYER

Drawings by RICHEY

ADVENTURES OF Bill

THE other day I mentioned to Bill that I had a letter from a relative who still lives in the old home town. "Here," I said, "with your kind attention I shall read you a few items."

Today I met a small size gent who claimed he was a contemporary of your's when you both were making history—such as it was—in the old *ABC* foundry. According to his story he had been the main spring of that particular plant. As a matter of plain, incontrovertible fact, well known to one and all, if he failed in his special duty for a moment, everything immediately would come to a standstill. Later during the conversation I learned he had full charge and responsibility to keep a proper head of steam in the ancient boiler that kept the little horizontal engine running. No motors in those days. All power tools driven by belts.

He spoke of you in the kindest terms and asked after your welfare just as anxiously as if you owed him some money.

I believe he would be more pleased to get a letter from you than one from the Pope himself. I told him I would mention his name and where he might be reached should the spirit move you toward the pen and ink and the scrap of paper. He lives in a town a few miles to the west. At least he has some kind of a home or more or less permanent roosting place there. In the meantime, a letter addressed to him in charge of George A. Goodfellow, Temperance street, in this town will be delivered and find him in his usual good health.

To this letter I replied as follows:

Valued favor of recent date safely to hand and contents carefully noted. Ahem! There is one point I wish you would check before I drop a note to your acquaintance. You give the address of the go-between as Temperance street. When I was down that way a few years ago, I spent a very pleasant half hour with George and Mrs. George. They lived in a house on Archimedes street.

Did you absent-mindedly write Temperance, instead of Archimedes? Of course there is a bare possibility that you shied away from Archimedes. I don't suppose half the population ever heard that name. Approximately 98.706 per cent of the remaining half have not the least idea on how the name is spelled or pronounced. I have heard Arch-im-ee-dees and Ark-im-ee-dees.

"You can skip that part," Bill said. "It is just a variation of the old newspaper classic. A policeman found a dead horse on Koskiusko Ave. When he attempted to write his report he was stymied on Koskiusko. He did not know if the word ended with an *a* or an *o*. After trying various combinations he called to one of his confederates 'Hey, Mike, drag that caDAVer away and dump it on Grant Ave.'

"Uncalled for and irrelevant comment ruled out. I shall continue":

Your comment to the effect that your shorty friend would appreciate my letter more than one from the Pope, loses some of its value when I reflect that in this district all the people bearing this man's name, are staunch Presbyterians. However on your assurance that George does live on Temperance street, I shall write him and enclose a letter to your friend. Incidentally I have not the faintest recollection of any person under your friend's name, firing the boiler at the *ABC* during my period of servitude.

"All very interesting," Bill admitted, "but where did the name of the street come from? Is it animal, vegetable or mineral?"

"The town has one main business street that compares favorably with similar streets in much larger towns. This street is known officially as Provost street. The next parallel street, is this Archimedes street. It has several business places, but does not compare at all with Provost street. The name Provost is understandable, since all the early settlers and the the majority of the present population were and are Scottish."

"There's your answer. The first settler's name was Archy Meedees. The Arch part is as Scottish as a sprig of heather or a bowl of parrich. Meedees may be the genteel way the owner spelled his name. In the original Gaelic the word probably was equivalent to the well known modern 'Nuts to you.' A roster of Scottish names with variations would show a greater variety than the Begat chapter in the Old Testament."

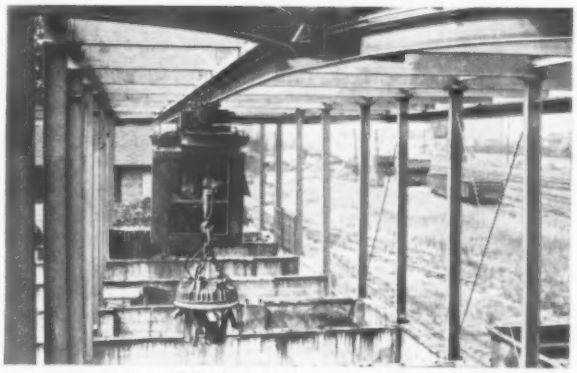
"Very ingenious," I said, "but as usual, no good. The one and only original Archimedes was a Grecian engineer and philosopher who flourished at a period when the inhabitants of Scotland and other parts of what is now Great Britain were run-

(*Continued on page* 192)

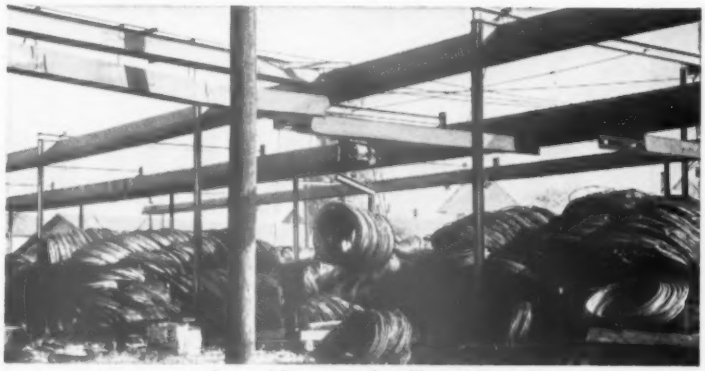
The ancient story is lacking to the extent that no reference is made to the scanty bathing costume

MOVE HEAVY LOADS ON MONORAIL

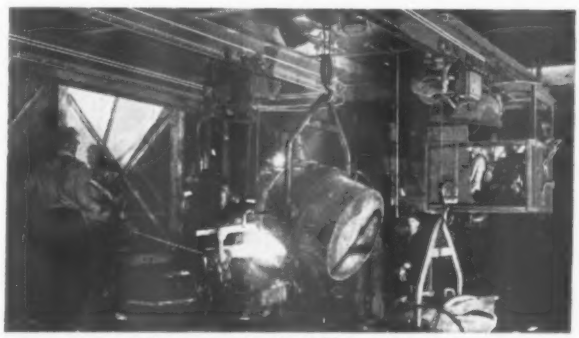
FOR LOWER COST HANDLING



Saves $25.00 per car unloading pig.



Saves 32c per ton handling rod.



Delivers metal with 60% less labor.

Increased tonnage of steel handled.

Tough jobs to handle are naturals for Mono-Rail. Any American MonoRail system increases plant capacity and production pace, conserves skilled labor, reduces damage and accidents and SAVES YOU MONEY.

Any system, regardless of how complicated, will pay for itself in time and money saved. One company reports a savings of 86% in handling costs.

Whatever your handling problem may be, there is an American MonoRail system adaptable to it. From the simplest hand-operated unit to the most complicated fully automatic system, American MonoRail engineers can suggest a system best suited to your problem.

SEND FOR BULLETIN C-1. A 56-page book showing successful applications of American Mono-Rail Systems.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE **CLEVELAND 7, OHIO**

"FALLS BRAND" ALLOYS
AMERICA'S LARGEST PRODUCERS OF ALLOYS

"FALLS" FLUX "A"
for
ALUMINUM

FALLS FLUX will reduce melting costs because it will efficiently separate the dross from molten aluminum thereby reducing rejections and scrap that are caused by dirty metal:—

...cleans, fluxes and removes gases, oxides and non-metallic impurities from all grades of aluminum.

...increases the metal yield about 3% because it puts all the metal usually lost in the dross back into the molten metal.

...does not smoke, fume or smell.

...is a dry white powder that will not absorb moisture and it can readily be handled with the bare hands without burning the skin.

WRITE FOR COMPLETE DETAILS

NIAGARA FALLS
Smelting & Refining Division
Continental Copper & Steel Industries, Inc.
BUFFALO 17, NEW YORK

(*Continued from page* 190)

ning around on their heavily calloused bare feet and clothed in practically nothing except a broad band of blue paint around the chassis. One of Archie's inventions, a device on the principle of a screw for raising water from a lower to a higher level, is known down to this day as the Archimedean screw.

"One day Arch decided to take a bath. History is discreetly silent on whether this was a daily, a monthly or a yearly proceeding. Anyhow who cares? The helper filled the tub to the top. When our hero hopped in, a certain amount of water flowed over. It would be interesting to know what Mrs. Arch had to say about that! In a flash of inspiration, fairly common among engineers, and in a lesser degree among ordinary people, Arch discovered one of the great natural laws, specific gravity. He was so surprised and elated, he jumped out of the tub and ran down the street shouting 'Eureka'!"

"So now we are in a town on the upper west coast of California. On Humbolt bay if you please not far from the big tree country. I knew a fella one time who came from out there. Some of his stories about the big trees would strain the credulity of at least two strong men. This lad also played left hand fiddle. I forget his last name. In fact I don't believe I ever heard his last name. To one and all he was known simply as Phil the Fiddler—"

"Let go your main sheet and bring 'er up into the wind. This Eureka has nothing to do with the California town on Humbolt bay, with the big trees that were monarchs of the forest when Columbus discovered America, or with left hand fiddlers. In the Greek language I have been given to understand Eureka means I have found it, or I know the answer, or I got 'er. Corresponds in a general way with the modern Keno or Bingo.

"When the naked lad went prancing down the street yelling Eureka, it is quite possible that modest people pulled the window shades almost to the bottom. The remainder of the population, particularly individuals inside and outside the pubs (Saloons, my friend to you) merely remarked 'So what?' and returned to their usual daily occupation of removing alcoholic temptation from the growing boys and girls, by the simple and heroic act of drinking it all themselves. Now you know more about Archimedes than the majority of the inhabitants of the old home town."

"Seems to me that constant reference would familiarize every per-

son with the name of this street."

"That is where you are off the beam, my gallant young friend. There was no constant reference to the name of either street. The natives solved the problem according to the time honored formula observed in schools and other places and probably most highly developed in the different branches of armed forces in the air, on the ground and on the sea. Did you ever hear the school principal referred to by his proper name? Did you ever hear the noble defenders of our country discussing the commanding officers? Some individual gifted with fiendish ingenuity and entire lack of respect for those in temporary authority, invents a characteristic name that sticks tighter than burdocks to a cow's tail.

"The good old formula was in full flower in the old home town. People simply referred to the two streets as the Front street and the Back street. Every person knew which street was meant and every one was satisfied."

"I see what you mean," Bill declared admiringly. "I wish I could remember them all. Some are recent and some I have not heard for years: Vinegar Puss, Trinidad, Fish Hawk, Choctaw, Carrots, Black Jack, Old Blood and Guts, Hurry Up—"

"No need of chanting the litany," I said. "I am over seven and I have done a bit of circulating."

"So you have," Bill admitted, "so you have. If I am not stepping in where angels fear to tread and all that kind of stuff, perhaps you would not mind telling me how you became one of the 1.294 per cent minority who knew all the dope about Archy what's-his-name and his street."

"A very fair question, indeed. Since I have one or two precious minutes to spare I shall be pleased to relieve your burning curiosity."

Bill muttered something to the effect that his curiosity was not as hot as all that.

"When I was a young lad going to the school conducted by Old Pickle Puss, he gave us a practically impossible home work assignment on one occasion. Nothing less, if you please, than a 300 word composition on the history of the town. That was on Friday and the compositions were to be turned in the following Monday. So far as I was concerned he might just as well have asked me to write a history of the first Punic war, or on the causes, direct and indirect leading up to the great flood, which gave Noah and the boys a chance to start from scratch. What were you going to say?"

20 Manpower Capacity

Combs Riddle Models CS and CR will process a volume of sand equal to the amount 20 men can riddle by hand.

TYPE CR—$280.

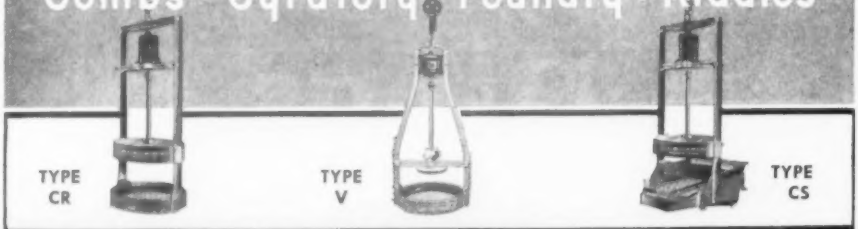
A money-making investment. Saves time . . . . saves manpower . . . . saves sand. Priced FOB Leavenworth.

TYPE CS—$290.

This model designed for automatic discharge of gaggers, refuse, etc. Comes completely equipped.

PROMPT DELIVERY FROM YOUR FOUNDRY SUPPLY HOUSE

Combs • Gyratory • Foundry • Riddles



GREAT WESTERN MANUFACTURING CO.
LEAVENWORTH, KANSAS, U.S.A.

How to reduce handling costs magnetically

Some crane operators drop Dings Lifting Magnets onto scrap to break it up. NO magnet should be so abused, but Dings builds them to give maximum life under such conditions.

Foundries doing swing grinding on heavy castings have found the Dings HOLD-TITE magnet save up to 25% in time! Another Dings *original*.

WANT to hold a rubber heel with its metallic plate during processing, convey pipe out of a galvanizing bath, remove canned goods from a cooker, lift a coil of strip steel, hold a casting during swing grinding?

For *handling* or *holding* magnetic materials, the Dings line of standard and special lifting magnets, magnetic conveying rolls, tables, clamps, fixtures and specialties offer maximum power, safety and economy. Consult Dings for the money-saving answer to *your* needs. Write for booklet "4740 W. McGeogh."

DINGS MAGNETIC SEPARATOR COMPANY

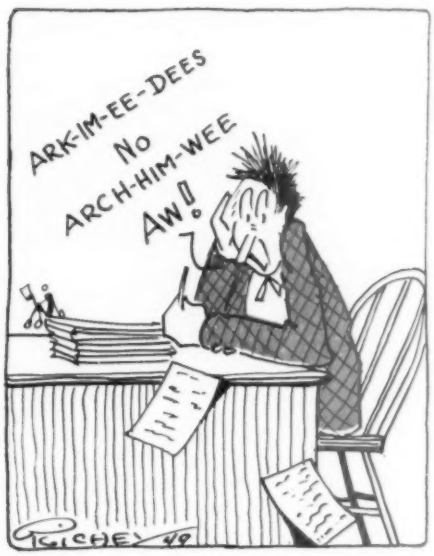
4708 W. Electric Ave., Milwaukee 14, Wis.

50 Years the Leader!

Dings Certified MAGNETIC STRENGTH

"Well," Bill said, "I was going to comment briefly on the feeding and sanitary conditions on the Ark, but let it go. Let it go for now. I knew a fella one time who won a canary at a raffle. When he arrived at home he opened a window and chased the bird out. His wife told him if he intended to keep a canary, he would have to attend to all its wants. I just thought I would mention the incident."

"Some other time, if you please. Some other time if you feel inclined you may drag in a flock of canaries, or pigeons or quacking ducks. At present if you will be kind enough to use your eyes and great big ears you will note that I have the floor. Subject, early school days. Quite a



What's in a name? Plenty

fascinating subject when viewed through a long period of years.

"Friday night I called on my quiet and non-gabby father for assistance. Many a time in my formative years, and even more so in later years when I had to play a somewhat similar role with children and grandchildren I realized how fortunate I was in the selection of a father. He never let me down. On this occasion he directed me to go down to the modest public library. There I would find a book written by a patriotic early settler setting forth in great detail every minor and major event connected with the history and development of OUR Town. I have since discovered there is at least one similar citizen in practically every community. Generally a retired school master. The book is a hobby and a labor of love.

"I found the book and cheerfully cribbed enough out of it to meet

the 300-word requirement. On Monday I received an A-plus for the effort. Old Pickle Puss congratulated me warmly. He read the essay to the class, and then pinned it up on the blackboard to serve as an incentive to all the other young terriers. Contrary to a rather widely held belief I am inclined to the opinion that school boys do not have any conscience. Instead of feeling any shame over the incident, I experienced a glow of pleasure in the reflection that I had put one over on the old boy. With such an auspicious start, I often wonder I did not develop into a stick up artist, a burglar or a highwayman. What do you think?"

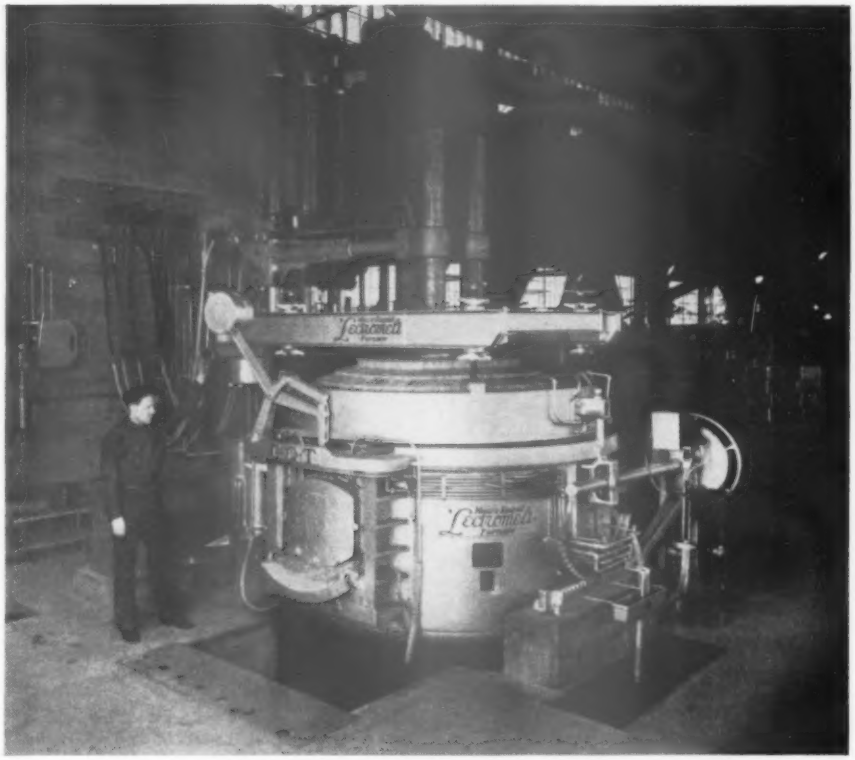
"If you ask my opinion," Bill said, "I should say that your excellent father probably belted all that stuff out of you, or to put it another way, he probably belted a conscience into you. Of course the possibility always remains that you never had the necessary backbone a very essential characteristic of up and coming young men who earnestly ply the trade of burglar, pick pocket or highwayman. Good Bye!"

Publishes Screw Thread Standard

American Society of Mechanical Engineers, 29 West 39th St., New York 18, has published the new American Standard Unified and American Screw Threads for Screws, Bolts, Nuts and Other Threaded Parts. The standard recently was approved by the American Standards Association, and is the fulfillment of the accord on unification of screw threads by British, Canadian and American representatives. Data presented includes tolerances of unified threads as well as those of the old classes continued during the transition period. Copies of the standard are available for $3.

Railroad Exhibit

Chicago Railroad Fair, which attracted more than 2,500,000 visitors in 1948, re-opened June 25 and will continue through Oct. 2. Sponsored by the railroads of the country and located on Chicago's lake front, most exhibits of modern railroad equipment and motive power will be shown again and a number of new ones have been added. Such equipment shows many examples of the use of castings in finished products. The popular "Wheels-A-Rolling" pageant, depicting the history of American transportation, has been improved and again is a main attraction.



Ideal for Melting the New Nodular Ductile Irons

Lectromelt Furnaces, like the size CQT pictured above, provide the close control of analysis and temperature required for successful utilization of the new nodular ductile irons. These furnaces readily reduce the sulphur and phosphorous content to the low limits needed to obtain the highest physical properties.

* * * *

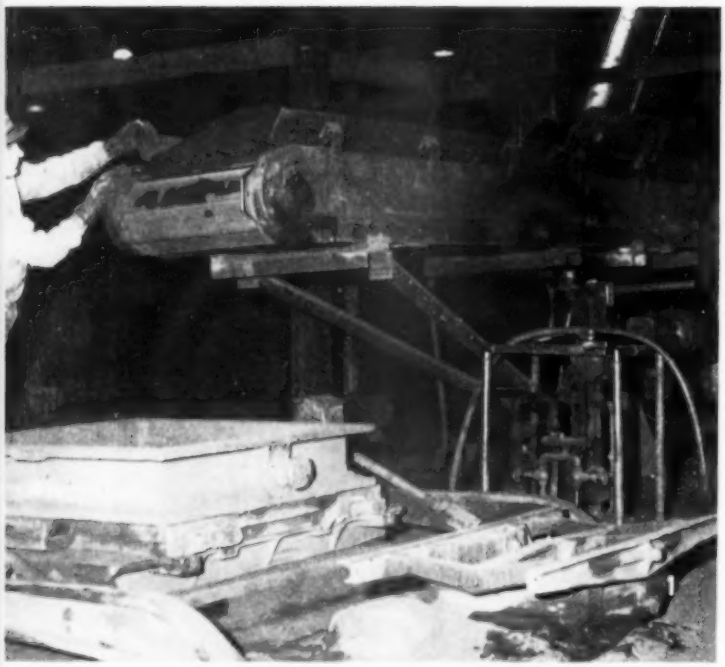
Lectromelt Forehearth Furnaces are being used in increasing numbers for control and adjustment of the analysis and temperature of metal melted in other equipment. They are especially designed for operation in conjunction with existing cupolas or air furnaces.

Write today for detailed information of Lectromelt's complete range of Forehearth and regular melting furnaces.

PITTSBURGH LECTROMELT FURNACE CORP.
PITTSBURGH 30, PA.

manufactured in: CANADA, Lectromelt Furnaces of Canada, Ltd., Toronto 2; ENGLAND, Birlec, Ltd., Birmingham; SWEDEN, Birlec Elektkougnar A/B, Stockholm; AUSTRALIA, Birlec Ltd., Sydney; FRANCE, Stein et Roubaix, Paris; BELGIUM, S. A. Belge Stein et Roubaix, Bressoux-Liege; SPAIN, General Electrica Espanola, Bilbao; ITALY, Forni Stein, Genoa.

MOORE RAPID Lectromelt FURNACES



PROGRESSIVE FOUNDRY MECHANIZATION

By WALTER RUDOLPH

ERIE Engine & Mfg. Co., Erie, Pa., several years ago faced the problem of modernizing its comparatively small foundry for the production of heavy gray iron castings. Over $300,000 has been expended in the program which, while in progress, suffered a setback in a disastrous fire that required partial plant rebuilding.

Management listed five aims in its modernization program: Better working conditions, higher quality castings, more efficient handling, lower production costs and increased production capacity. Departments affected by the program include melting, coremaking, molding, shakeout, cleaning and chipping.

The program was begun "in reverse," so to speak, in that the last named of these divisions, chipping, was tackled first. It was reasoned that improvement in this department would reduce the labor turnover through improved working conditions, and increase the department's capacity. It was also decided that washed castings would speed chipping operations.

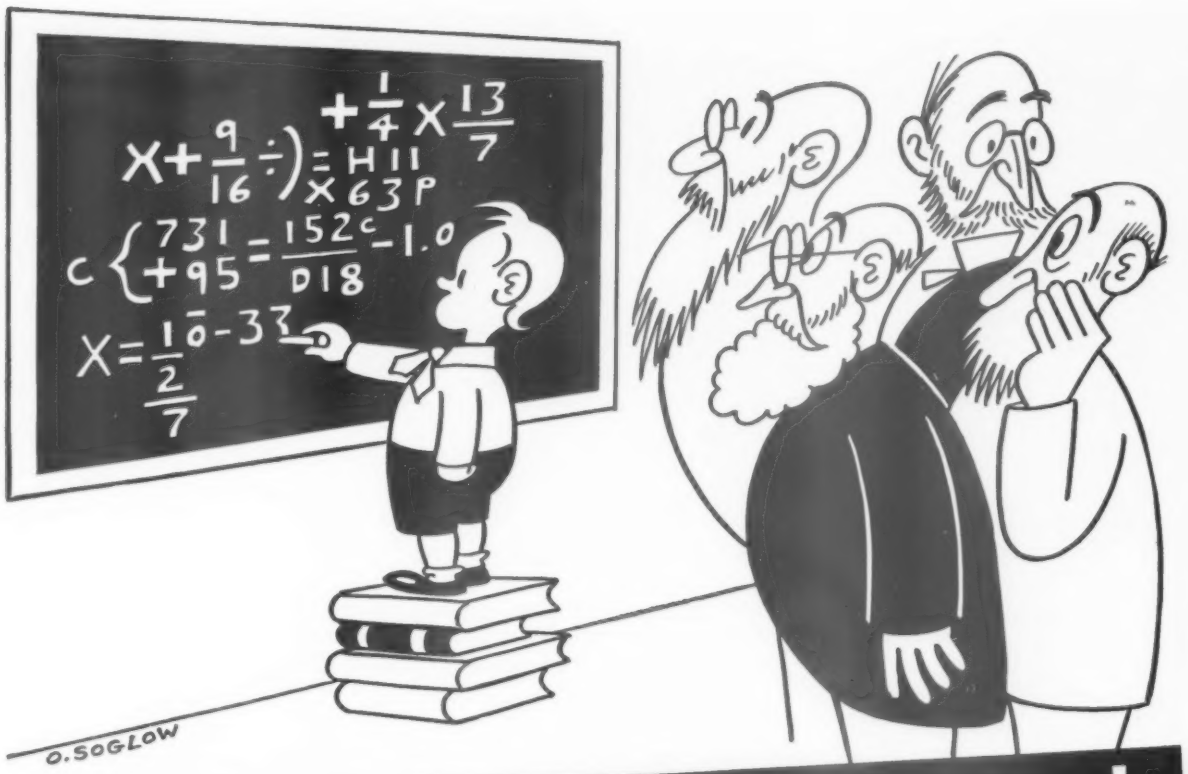
Former practice in core knockout work was supplanted by a hydroblast installation (Fig. 3). Reclaimed sand is reconditioned and dumped into skip boxes which are returned to the foundry to be mixed with new sand. An overhead crane in this department was another step in improving working conditions.

Over 90 per cent of the dust was eliminated in the cleaning and chipping department, and chippers are now delivered a washed casting that requires only finish chipping. Many hours' work are saved on individual castings; also, one core cleaner can now handle in 8 hours what three men formerly required 24 hours to do. Finally, considerable savings in sand and scrap result.

New cranes in the main bay of the foundry speed shakeout of the large castings produced, and an entirely new sand handling and reconditioning system accelerates this phase

(*Concluded on page* 198)

Fig. 1—Feeder moving sand from hopper to flask at modernized foundry of Erie Engine & Mfg. Co., Erie, Pa. Fig. 2—Stationary sandslinger ramming large core. Fig. 3—Blast cleaning a casting with water and sand



You'll be surprised at these figures!

- 80 million Americans own $48 billion of U. S. Savings Bonds.
- 20,000 of the nation's 38,000 firms employing 100 or more persons are operating Payroll Savings Plans.
- 7,500,000 workers are buying an individual average of $20 of Bonds per month.
- For the year 1948, sales of Series E Bonds *exceeded redemptions* by $495,148,000. The net figure for all Series after redemptions and maturities was $2,151,140,000.

What does all this mean to you? Well, it means first of all that your Treasury Department is successful in its program of increasing the nation's economic security by spreading the national debt. Secondly it means that most of the nation's business leaders recognize the value of the Payroll Savings Plan sufficiently to promote it within their companies.

For example...

To give you some idea of the Plan's growing popularity: 86,384 employees of a prominent electrical manufacturing company were investing in Bonds at the rate of $30,005,270 as of the end of 1948. This is a gain of nearly 100% over 1947, when 45,000 employees participated in that company. The treasurer of a well-known shoe company reported that, of his concern's 19,060 employees, 9,240 were in the Plan and had invested $146,807.32 in Bonds via deductions during the preceding month.

Why promote it?

We all know how buying Bonds builds an individual's future security. But there are *company* benefits too! Nation-wide experience shows that Payroll Savings increases each participating employee's peace of mind—makes him a more contented, more productive worker. It reduces absenteeism, lowers accident rates, increases output, and improves employee-employer relations.

It's easy to boost participation

1. See that a top management man sponsors the Plan.

2. Secure the help of the employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Nation-wide experience indicates that 50% of your employees can be persuaded to join—without high-pressure selling. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bond Division.

The Treasury Department acknowledges with appreciation the publication of this message by

THE FOUNDRY

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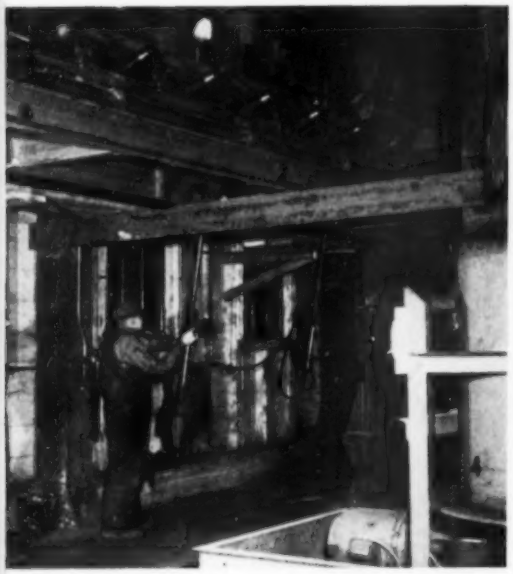


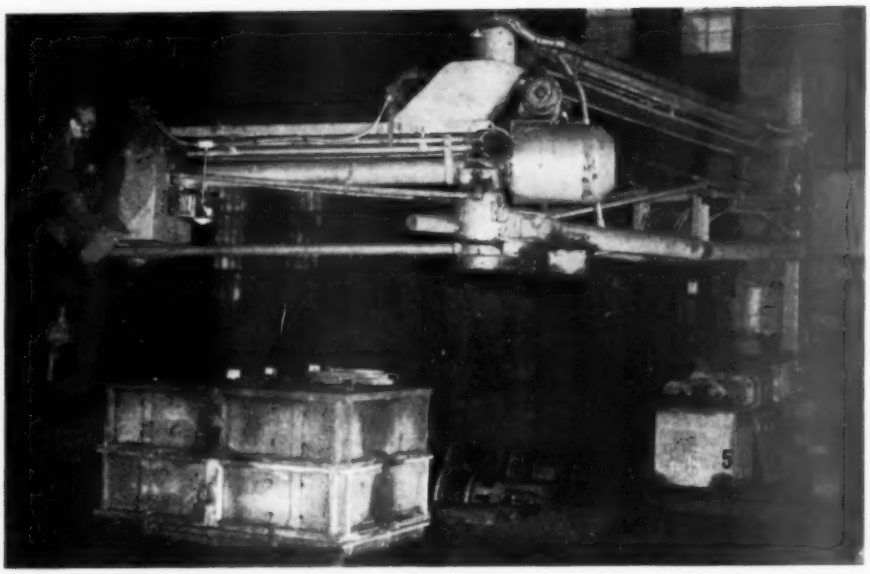


Fig. 4—Belt conveyor leads from hoppers to core sand mixer. Fig. 5—Motive type sandslinger ramming a large flask

(*Concluded from page* 196)

of foundry work and eliminates sand piles throughout the foundry. More productive floor space is thus obtained, and working conditions are enhanced.

Still another new crane was installed in the foundry yard, and storage and handling of foundry materials have been expedited considerably, while allowing the removal of flasks from the foundry proper to the yard, again increasing working floor space.

As the cleaning and chipping programs developed, the molding department reorganization was begun. A large motive type sandslinger (Fig. 5) was installed to operate the entire length of the foundry's main bay. All flasks not in use were stored in the yard, the increased working space permitting the placing of flasks to gain the greatest use from the slinger. Smaller side floor molding was expanded by installations of hopper-feeders, such as shown in Fig. 1. These feeders are so placed as to drop the sand into the flask already placed on the bumper. Hoppers are filled by means of an electrically operated bucket, after sand reconditioning.

As mold production increased, it became necessary also to greatly increase coremaking capacity. A stationary sandslinging unit was installed to handle large cores, (Fig. 2), with consequent savings in material and labor.

Overhead sand handling and mixing equipment was installed to satisfy the new demand for core sand. Three hoppers over a continuous conveyor belt are controlled by lever-operated rotary gates. Fig. 4 shows the belt conveyor leading from the hoppers to a mixer and the position of the feeder that handles sand from the mixer to the core sand slinger.

Melting capacity was increased considerably by the installation of a new cupola and new charging equipment.

Program for ASTM Pacific Meeting

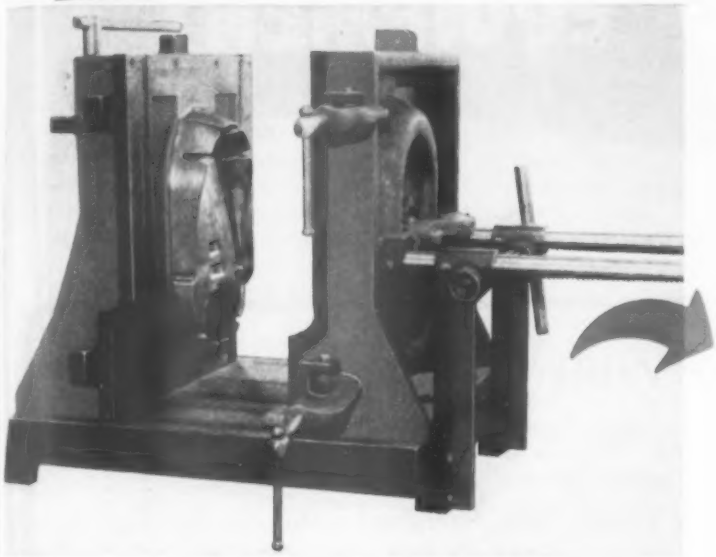
Tentative program arranged for the Pacific Area meeting of the American Society for Testing Materials to be held in San Francisco during Oct. 9 to 14 lists 15 sessions at which 70 papers will be presented. Of specific interest to foundrymen is the Symposium on Cast Iron which will be held Thursday afternoon Oct. 13. Five papers to be presented include:

"Mechanical Testing and Properties of Gray Cast Iron " by Charles K. Donoho, American Cast Iron Pipe Co., Birmingham; "Development, Significance and Uses of Specifications for Cast Iron " by Hyman Bornstein, Deere & Co., Moline, Ill.; "Automotive Cast Irons Including Brake Drums" by Richard G. McElwee, Vanadium Corp. of America, Detroit; "Progress in Use of Cast Iron at Elevated Temperatures" by James S. Vanick, International Nickel Co. Inc., New York, and "Applications and Uses of Gray Iron Castings Including Significance of Various Properties of Gray Cast Iron" by Charles O. Burgess, Gray Iron Founders Society, Cleveland.

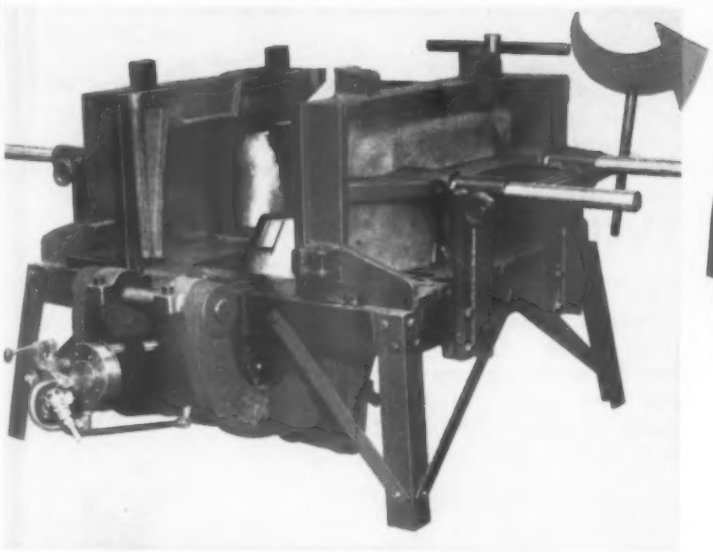
Other sessions dealing with metals include those on plasticity and creep which will be held Monday afternoon, Oct. 10, and fatigue of metals which will be held the same evening. Papers on plasticity and creep include: "Use of Creep Data in Design" by H. C. Cross and L. R. Jackson, Battelle Memorial Institute, Columbus, O.; "Super Creep-resistant Alloys" by J. W. Freeman, N. D. Frey and E. E. Reynolds, University of Michigan, Ann Arbor, Mich.; "Application of Forming Criteria to Production Problems" by W. Schroeder, Lockheed Aircraft Corp., Burbank, Calif., and "Experimental Exploration of Plastic Flow in Sheet Metals" by L. R. Jackson, Battelle Memorial Institute, Columbus, O., and W. T. Lankford, Carnegie-Illinois Steel Corp., Pittsburgh.

Fatigue of metals session will have the following papers: "Introduction to Fatigue Session—A Broad Look at the Fatigue of Materials Field" by R. E. Peterson, Westinghouse Electric Corp., East Pittsburgh, Pa.; "Fatigue Strength of Steel Through the Range from 0.5 to 30,000 Cycles of Stress" by M. H. Weisman, North American Aviation Inc., Inglewood, Calif.; "Fatigue Notch Sensitivities of Some Aircraft Structural Materials" by H. Grover, Battelle Memorial Institute, Columbus, O., and "Fatigue Strength of Aircraft Materials and Fastenings" by Thomas Piper, Northrop Aircraft Inc., Hawthorne, Calif.

IT TAKES THESE TO MAKE THIS



MANUAL PERMANENT MOLD



SEMI-PNEUMATIC PERMANENT MOLD

Permanent Mold Aluminum castings are, without a doubt, the answer to economical, quality production . . . And because Master Pattern designed and built the molds shown above, the customer got off to a "flying start" in his production. Suffering little if any delays due to adjustments or the need to eliminate "bugs" in the molds.

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In Large Quantities, Quickly · Economically

Master Pattern has designed and built hundreds of aluminum permanent molds over a period of more than ten years . . . Their experience, knowledge of design and the ability to take casting specifications and build molds ready for immediate operation is known and respected. Send your next casting problem to Master Pattern and be certain of getting the right answer. Write now!

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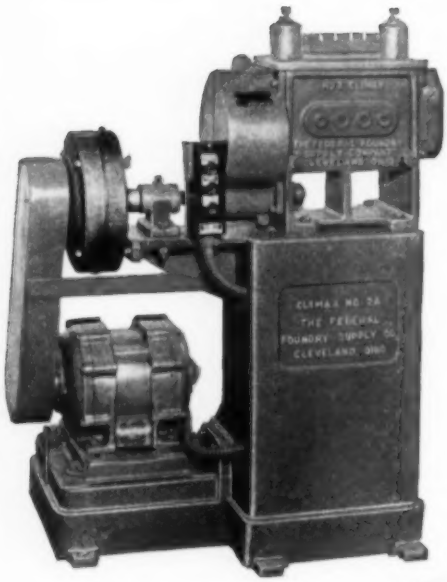
Federal FOUNDRY EQUIPMENT

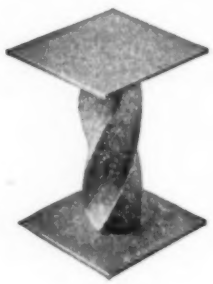


CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and reusing core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely—by unskilled labor. A complete descriptive circular is yours for the asking.

FOLLOW THE FEDERAL LINE

The products on this page represent three of the many items which Federal supplies to the foundry trade. Altogether we have more than 400 different foundry products. Rely on The Federal Foundry Supply Company for your needs.



TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

"THE TWIST DOES THE TRICK"

FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shoveling room. Write for information. Prompt delivery.

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INDUSTRY REPORT . . . Gray Iron and Steel Foundries

THE gray iron foundries industry shipped products valued at $1,173 million during 1947, according to preliminary figures released by the Bureau of the Census, Department of Commerce, Washington. This represents an increase of 322 per cent over the $278 million value of products reported by the industry in 1939, when the last Census of Manufactures was taken.

Value added by manufacture in the industry during 1947 amounted to $733 million, an increase of 333 per cent over the $169 million value added in 1939.* Production worker emplomont in the industry averaged 157,361 in 1947 as compared with 75,680 in 1939. Wages paid to production workers increase 396 per cent, from $89 million in 1939 to $441.7 million in 1947. The industry's expenditures for new plant and equipment during 1947 totaled $54.1 million.

Steel foundries shipped products valued at $413 million during 1947, representing an increase of 205 per cent over the $135 million value of products reported by that industry in 1939. Value added by manufacture in the industry during 1947 amount to $267 million, an increase of 196 per cent over the $90 million value added in 1939.*

Average employment in the steel foundry industry amounted to 63,668 in 1947 as compared with 35,567 in 1939. Salaries and wages paid to all employees increased 244 per cent, from $55.4 million in 1939 to $190.5 million in 1947. The industry's expenditures for new plant and equipment during 1947 totaled $13.5 million, compared with $4.1 million for 1939.

These statistics are derived from a preliminary tabulation of manufacturers' reports in the 1947 Census of Manufactures and represent data for establishments primarily engaged in the production of gray iron and steel castings. They do not include data for establishments whose production of castings is a minor part of their total activity, nor for establishments which consume their total production of castings. The reporting foundries in the gray iron industry during 1948 accounted for about 55 per cent of total shipments. Final and more detailed figures, including data on the captive production of castings and shipments of castings by establishments primarily engaged in other activities will appear in the census publication, "Blast Furnace, Steel Mill and Iron and Steel Foundry Products," which will be published and offered for sale by the Superintendent of Documents in the near future.

* Value added by manufacture is calculated by subtracting from the value of products, cost of materials, supplies, containers, fuel, purchased electric energy, and contract work.

General Statistics for the Gray Iron Foundries Industry
United States Totals: 1947 and 1939

(Money figures and man-hours in millions)

Item	1947	1939
Number of establishments ..	1,654	1,254
All employees:		
Number (average for the year)	173,776	n.a.
Salaries and wages (total)..	$512.2	n.a.
Production and related workers:		
Number (average for the year)	157,361	75,680
Man-hours (total)	328.5	n.a.
Wages (total)	$441.7	$89.0
Value added by manufacture*	$732.6	$169.3
Cost of materials, fuel, electricity, and contract work..	$440.0	$108.6
Value of shipments†	$1,172.7	$277.8
Expenditures for new plant and equipment	$54.1	n.a.

General Statistics for the Steel Foundries Industry
United States Totals: 1947 and 1939

(Money figures and man-hours in millions)

Item	1947	1939
Number of establishments	204	164
All employees:		
Number (average for the year)	63,668	35,567
Salaries and Wages (total)..	$190.5	$55.4
Production and related workers:		
Number (average for the year)	55,252	30,088
Man-hours (total)	109.9	n.a.
Wages (total)	$153.7	$41.9
Value added by manufacture* ..	$267.2	$90.2
Cost of materials, fuel, electricity, and contract work..	$145.9	$45.2
Value of shipments†	$413.1	$135.5
Expenditures for new plant and equipment	$13.5	$4.1

n.a. Not available.

* For 1947, value of shipments less cost of materials, fuel, electricity, and contract work. For 1939, value of production less cost of materials, fuels, electricity, and contract work.

† Value of production for 1939.

Prepared by Bureau of the Census, Industry Division, Metals and Metal Products Section.

General Statistics for the Gray Iron Foundries Industry

(Money figures in millions)

Item	United States, total	California	Illinois	Indiana	Massachusetts	Michigan	New Jersey	New York	Ohio	Pennsylvania	Wisconsin	All Other States
Number of establishments	1,654	111	112	92	72	131	60	85	165	178	66	582
All employees:												
Number (average for the year)..	173,776	6,176	11,355	8,889	4,435	40,146	7,192	8,109	21,131	14,490	7,892	43,961
Salaries and wages (total)	$512.2	$19.0	$34.8	$26.7	$13.7	$127.1	$21.8	$25.0	$64.2	$42.1	$24.2	$114.2
Production and related workers:												
Number (average for the year) ..	157,361	5,630	10,286	8,115	4,024	35,862	6,471	7,412	19,431	13,137	6,538	40,455
Wages (total)	$441.7	$16.5	$29.3	$23.3	$11.5	$108.7	$18.7	$21.9	$56.6	$36.3	$19.9	$99.0
Value added by manufacture*	$732.6	$28.9	$49.8	$39.5	$19.4	$155.5	$32.5	$35.2	$97.7	$60.5	$35.7	$177.9
Cost of materials, fuel, electricity, and contract work	$440.0	$13.9	$32.5	$19.1	$8.0	$101.8	$22.4	$16.4	$57.3	$42.2	$18.8	$107.6
Value of shipments	$1,172.7	$42.8	$82.3	$58.5	$27.5	$257.3	$54.9	$51.6	$154.9	$102.7	$54.5	$285.7

General Statistics for the Steel Foundries Industry, by State, 1947

(Money figures in millions)

Item	United States, total	Illinois	Indiana	Michigan	Ohio	Oregon	Pennsylvania	Wisconsin	All other States
Number of establishments	204	20	7	13	23	5	37	9	90
All employees:									
Number (average for the year)	63,668	9,637	4,824	2,912	9,539	731	17,800	2,359	15,866
Salaries and wages (total)	$190.5	$28.8	$15.1	$9.2	$29.9	$2.0	$52.3	$8.1	$45.1
Production and related workers:									
Number (average for the year)	55,252	8,349	4,040	2,598	8,352	558	15,570	2,021	13,764
Wages (total)	$153.7	$23.3	$11.5	$7.7	$24.0	$1.7	$42.5	$6.4	$36.6
Value added by manufacture*	$267.2	$45.4	$17.2	$12.3	$41.6	$3.3	$72.8	$13.4	$61.2
Cost of materials, fuel, electricity, and contract work	$145.9	$19.8	$12.9	$8.1	$23.0	$1.0	$40.2	$4.9	$36.0
Value of shipments	$413.1	$65.2	$30.1	$20.4	$64.6	$4.3	$113.0	$18.3	$97.2

* Value of shipments less cost of materials, fuel, electricity, and contract work.

FOUNDRY Statistics

Castings Production

In Philadelphia Federal Reserve District

(May, 1949)

Type	Percentage Change From Apr., 1949	May, 1948
Gray Iron	—10.9	—39.7
Malleable Iron	+25.3	—59.3
Steel	—18.0	—32.3
Nonferrous	+16.0	—71.8

Source: University of Pennsylvania.

Foundry Production Workers

ESTIMATED NUMBER:

Type Foundry	Mar. 1949	Feb. 1949	Mar. 1948
Gray Iron	101,600	105,800	119,900
Malleable Iron	33,500	34,800	37,900
Steel	70,500	72,300	73,000
AVERAGE WEEKLY EARNINGS:			
Gray Iron	$53.53	$56.06	$58.47
Malleable Iron	52.35	56.49	57.79
Steel	60.55	62.57	59.88
AVERAGE WEEKLY HOURS:			
Gray Iron	36.4	38.1	41.8
Malleable Iron	35.4	37.6	40.8
Steel	39.4	40.5	41.3

Source: Bureau of Labor Statistics. Estimates of number of foundry production workers adjusted to Federal Security Agency data through 1945.

Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1948	1949
Jan.	380.9	149.9
Feb.	367.3	144.4
Mar.	326.2	190.8
Apr.	412.0	172.0
May	388.5	121.9
June	376.8	...
July	456.3	...
Aug.	324.7	...
Sept.	273.5	...
Oct.	296.0	...
Nov.	284.4	...
Dec.	243.7	...

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Shipments of Castings

(Reported by Bureau of the Census)

Gray Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	12,540,960	7,181,299	.....
1948			
Jan.	1,064,335	584,238	2,802,685
Feb.	1,024,450	571,406	2,769,408
Mar.	1,169,085	659,821	2,726,415
Apr.	1,051,083	584,969	2,690,893
May	992,692	555,728	2,601,626
June	1,072,040	597,624	2,587,081
July	914,464	490,359	2,601,084
Aug.	1,050,948	597,678	2,598,789
Sept.	1,088,051	615,978	2,587,385
Oct.	1,148,422	642,485	2,522,831
Nov.	1,099,827	606,380	2,406,737
Dec.	1,110,512	624,739	2,284,348
Total	12,785,909	7,131,405	.....
1949			
Jan.	1,040,343	573,164	2,064,861
Feb.	986,591	535,163	1,857,403
Mar.	1,074,704	567,041	1,639,465
Apr.	929,307	467,433	1,445,532

Steel Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	1,625,055	1,203,504	.....
1948			
Jan.	141,068	108,282	491,745
Feb.	142,434	107,762	497,097
Mar.	162,891	125,550	508,822
Apr.	150,305	114,896	472,370
May	143,337	111,616	482,531
June	152,894	117,794	469,973
July	120,445	87,927	497,410
Aug.	140,223	107,538	472,481
Sept.	149,222	112,551	447,972
Oct.	152,983	114,819	424,460
Nov.	146,835	110,275	395,013
Dec.	157,395	116,285	354,458
Total	1,760,032	1,335,295	.....
1949			
Jan.	140,577	103,503	338,889
Feb.	135,042	99,425	320,202
Mar.	138,889	102,027	284,754
Apr.	119,953	83,277	250,506

Malleable Iron Castings

(Net tons)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	895,054	513,228	.....
1948			
Jan.	77,927	45,788	205,859
Feb.	75,225	42,670	209,447
Mar.	86,767	50,065	203,351
Apr.	80,602	46,034	199,578
May	76,078	42,338	191,553
June	81,747	48,170	178,760
July	64,995	35,018	180,421
Aug.	73,272	41,201	176,824
Sept.	77,815	43,985	164,002
Oct.	81,761	44,305	158,351
Nov.	77,194	42,241	146,422
Dec.	79,882	43,397	137,385
Total	933,265	525,212	.....
1949			
Jan.	71,876	38,040	126,393
Feb.	66,744	35,074	118,318
Mar	72,052	38,143	102,379
Apr.	61,329	31,728	94,958

Aluminum Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1947				
Total	441,996	155,112	174,515	.....
1948				
Jan.	37,889	12,670	15,020	86,176
Feb.	37,963	12,177	15,055	88,032
Mar.	41,794	13,343	16,258	78,344
Apr.	38,269	12,407	14,563	78,499
May	33,868	11,854	12,351	75,219
June	35,822	12,296	13,239	72,930
July	28,944	9,851	10,504	70,321
Aug.	32,136	9,883	13,174	68,334
Sept.	35,877	11,822	13,353	66,773
Oct.	35,542	11,733	13,216	65,538
Nov.	34,550	11,410	13,012	63,767
Dec.	31,836	10,335	11,589	59,154
Total	424,490	139,781	161,334	.....
1949				
Jan.	29,142	9,702	10,386	55,580
Feb.	27,228	9,286	9,339	52,916
Mar.	27,478	9,348	9,386	50,508
Apr.	23,801	8,041	8,353	45,638

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments Total	Shipments Sand	Shipments Perm. Mold	Unfilled *Orders
1947				
Total	1,051,742	960,732	51,139	.....
1948				
Jan.	85,432	77,433	4,593	74,579
Feb.	87,169	79,329	4,509	71,143
Mar.	96,344	87,249	5,261	70,544
Apr.	89,035	80,426	4,705	70,726
May	81,286	72,982	4,910	65,818
June	84,817	76,241	5,148	64,149
July	71,803	64,389	4,670	66,014
Aug.	81,976	73,947	5,018	69,126
Sept.	86,973	78,830	4,999	66,574
Oct.	91,311	82,463	5,293	62,571
Nov.	86,497	77,751	5,107	60,892
Dec.	88,182	79,750	4,796	53,671
Total	1,030,825	930,790	59,009	.....
1949				
Jan.	76,348	68,379	4,593	48,124
Feb.	68,776	61,278	3,951	40,517
Mar.	70,173	62,557	3,927	37,646
Apr.	59,573	52,837	3,458	32,746

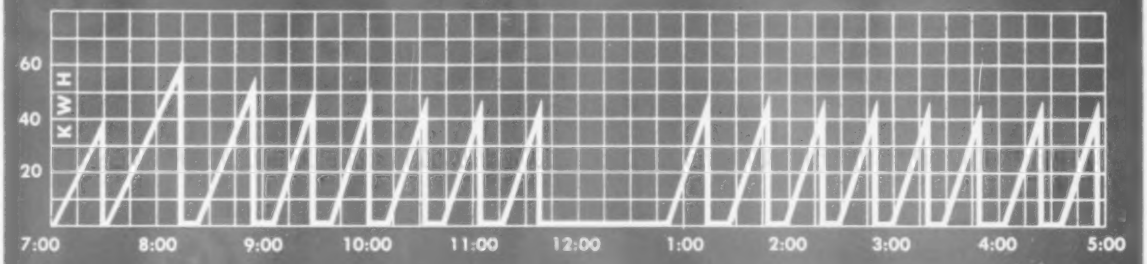
Magnesium Castings

(Thousands of pounds)

	Shipments Total	Shipments For Sale	Unfilled *Orders
1947			
Total	7,693	7,050	....
1948			
Jan.	659	597	2,701
Feb.	655	591	2,866
Mar.	704	625	2,741
Apr.	673	605	2,640
May	622	542	2,673
June	709	624	2,712
July	554	521	2,684
Aug.	703	655	2,834
Sept.	745	700	3,206
Oct.	708	650	3,070
Nov.	728	683	3,416
Dec.	754	695	3,455
Total	8,214	7,488	....
1949			
Jan.	822	761	3,821
Feb.	813	756	3,586
Mar.	879	800	3,227
Apr.	726	669	3,234

* For sale only.

DETROIT ROCKING ELECTRIC FURNACE



LFC—Brass

INSTALLATION—Three type LFC, 125 KW, 350 lb. nominal cold charge capacity Detroit Electric Furnaces in a Minnesota plumbing goods manufacturing company. Equipped with automatic rocking and electrode control.

OPERATION— Melt 350 lb. heats of 78% Cu, 13% Zn, 6½% Pb, 2½% Sn, and tapped into 400 lb. crucible. Operate 16 hours per day.

COSTS— 1947 Average
Power 273 KWH/Ton—$3.53 • Electrodes, 410 lbs. bronze/lb. electrode—$ .66
Refractory, 5000 heats/lining—$ .72 • Melt loss, ¾% @ 17c/lb.—$2.60

CONTROL + UNIFORMITY + SPEED

Equals BETTER QUALITY + LOWER COST

Detroit Rocking Electric Furnaces offer year-in, year-out high efficiency, uniform output, lowest possible metal shrinkage, plus constant and positive control of atmospheric conditions, accuracy of composition and speed of operation.

All-electric operation saves handling and storing of messy, bulky fuels. Indirect arc eliminates costly carbon pick-up. The arc, established clear of molten bath at all times, assures uniform melting chamber temperatures and is automatically maintained at optimum power input.

On receipt of your production data, our engineers will furnish you with complete facts on the greater economy, constant and higher quality control, and faster output you achieve with Detroit Rocking Electric Furnaces which meet your most exacting requirements. Detroit Electric Furnaces for melting ferrous or non-ferrous metals are available in 10 to 4,000 lb. capacities, with conical or cylindrical melting chambers. For complete details, write today, to

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OBITUARY

ROBERT R. FAUNTLEROY, 69, president, Moline Malleable Iron Co., St. Charles, Ill., and former president of the Malleable Founders' Society, died June 6. Mr. Fauntleroy was associated with Link-Belt Co., Chicago, from 1899 until 1905, when he became secretary of Moline Malleable Iron Co., succeeding his father as president in 1921. He was president of American Malleable Castings Association in 1929, and served as a director of its successor organizations, Malleable Iron Research Institute and Malleable Founders' Society of which he was president in 1933-34. Prior to the war he was active in gaining government recognition of the malleable industry and during the war was chairman of the Malleable Industry Advisory Committee to the OPA. Last year he was presented the Charles H. McCrea award medal by the Malleable Founders' Society, for distinguished service to the industry.

* * *

Harry G. Lamker, superintendent of foundries, Wright Aeronautical Corp., Wood Ridge, N. J., and a national director of the American Foundrymen's Society, died June 17. Mr. Lamker was born in Pittsburgh and was graduated from Carnegie Institute of Technology. He had been associated with the aluminum foundry industry for over 30 years. Active in the Aluminum and Magnesium Division of the AFS, he was the first representative of that group to be elected to the national board and was currently serving his third year as a director.

HARRY G. LAMKER

* * *

Joseph F. Westendorf, 80, founder and president, Dayton Casting Co., Dayton, O., died at his home there June 6. Mr. Westendorf was born in Dayton, and with his brother John Westendorf, founded the Dayton Casting Co. in 1909 and has served as its president since that time. In 1922 he became associated with Premier Rubber Co., Dayton, and also served as its president until his death.

* * *

Joseph L. Dostal, 65, president and treasurer, Dostal Per-Mold Foundry Co., Pontiac, Mich., died July 1. Mr. Dostal was associated with Holley Carburetor Co., Detroit, for many years, and was a pioneer in the production of permanent mold gray iron castings. He had served as vice president-general manager of the foundry division, Eaton Mfg. Co., Detroit, for 13 years, until he organized his own company in 1945.

JOSEPH L. DOSTAL

* * *

James J. Quinn, 77, for 35 years night superintendent, National Malleable & Steel Castings Co., Cleveland, died July 4. Mr. Quinn, a native of Ireland, resided for some years in Springfield, O. He went to Cleveland in 1908, as night superintendent for the malleable company.

* * *

Ora S. Dysart, 77, associated with Tappan Stove Co., Mansfield, O., for 31 years before his retirement, died June 14 at his home there. Mr. Dysart, father of Harold O. Dysart, secretary of the stove company, was a member of its Quarter Century Club.

* * *

William W. Thobaben, 78, for 35 years chief of the pattern shop, Eberhard Mfg. Co., Division of Eastern Malleable Iron Co., Cleveland, died June 30, at the Altenheim, Cleveland.

* * *

Russell G. Hay, 59, vice president, the Ayers Mineral Co., Zanesville, O., died June 12, in Ocala, Fla., following a long illness. Mr. Hay was associated with the company for 27 years, many of which were spent in contacting the foundry, ceramic and glass industries. He was active in the National Industrial Sand Association and was a member of the American Foundrymen's Society.

* * *

John R. Forbes, 75, head of the John R. Forbes Foundry & Iron Works, Jersey City, N. J., and president of its subsidiary, the Grate Bar Co., New York, died June 22, at his home in South Orange, N. J. A native of England, Mr. Forbes established the foundry which bears his name, in 1898.

* * *

Abraham Rubin, 58, president, Armet Alloys Inc., Cleveland, died at his home there June 1. Mr. Rubin was associated with the National Smelting Works, Cleveland, for 35 years, and for a long period was its vice president and manager. About a year ago he organized Armet Alloys Inc.

* * *

Frank A. Kerkhoff, 65, maintenance manager, Ohio Pattern Works & Foundry Co., Cincinnati, died June 13. Mr. Kerkhoff had been associated with the company for more than 25 years.

* * *

S. Gee Lowe, 67, president, Westlectric Castings Corp., Los Angeles, died June 20, at his home in San Marino, Calif.

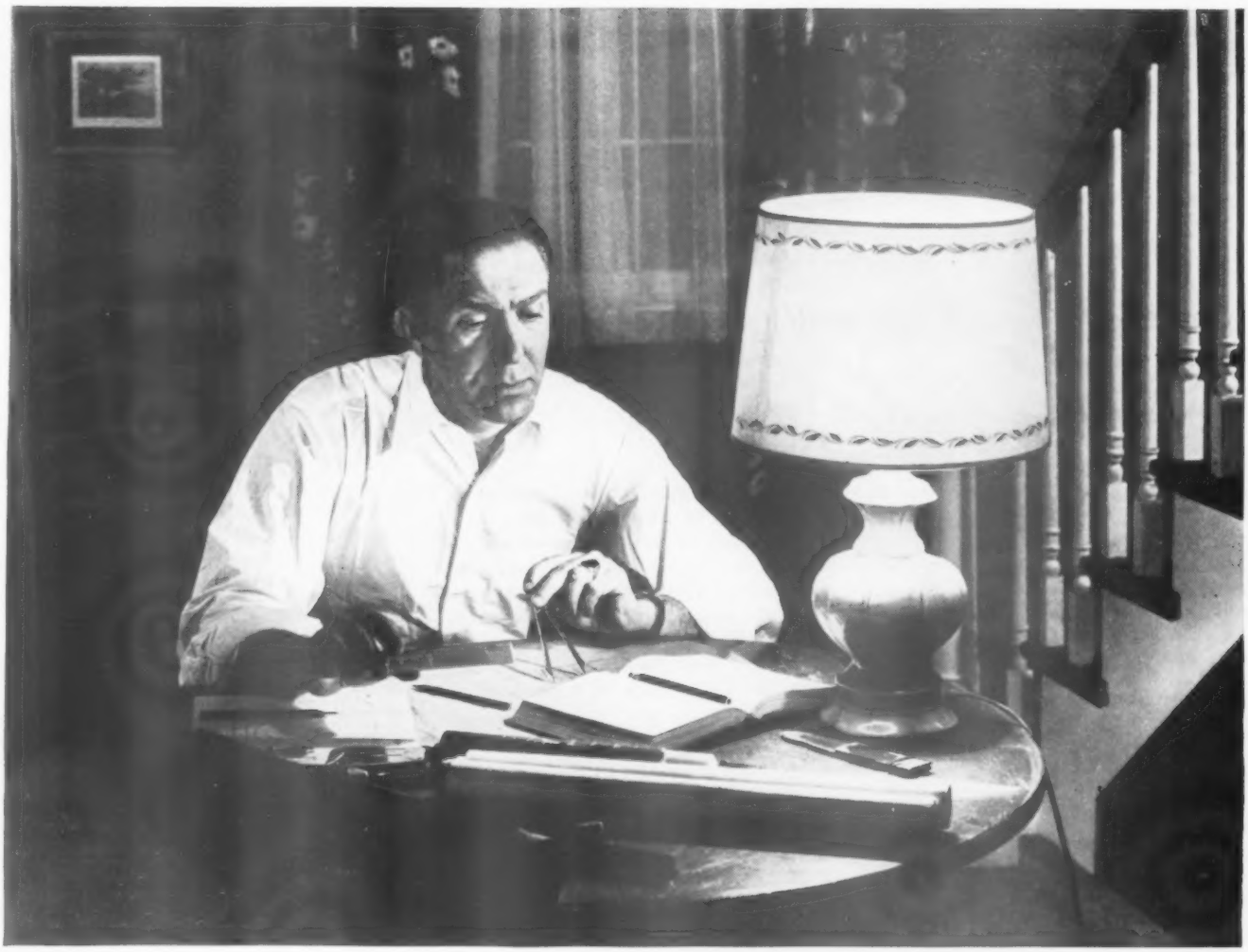
* * *

D. J. Neasham, president, Ottumwa Iron Works, Ottumwa, Iowa, died recently.

Offers Guide for Junior Engineers

Engineers' Council for Professional Development, 29 West 39th St., New York 18, recently has published "A Professional Guide for Junior Engineers" written by the late William E. Wickenden, former president of Case Institute of Technology, and edited and collated by G. Ross Henninger, director of publications, Illuminating Engineering Society. The book is priced at $1.

The book presents the philosophy and engineering ethics a young engineer needs for success as viewed by Dr. Wickenden. It opens with a historical survey of the engineer's heritage, then traces the engineering profession through its every aspect, what the young engineer can expect to find, the difference between a trade and a profession, professional relationships, and concluding with Dr. Wickenden's most famous essay on a philosophy of life—the Second Mile.



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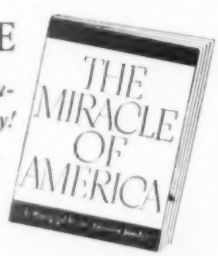

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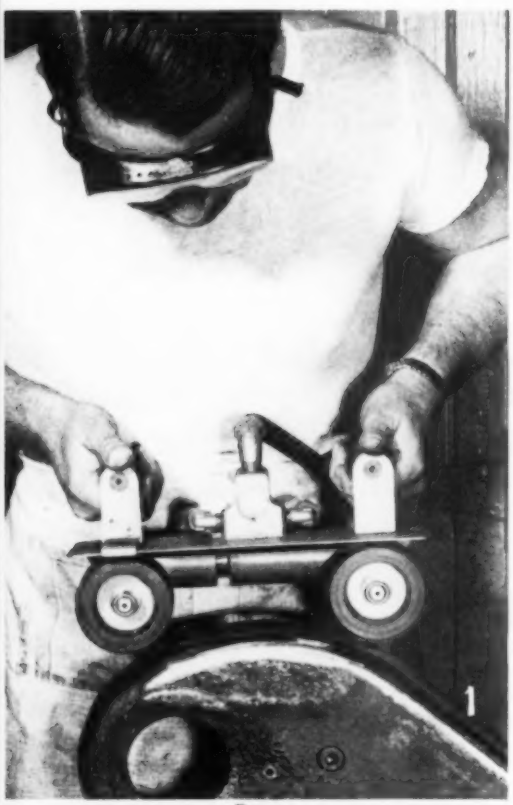
NEW Equipment AND SUPPLIES

For Additional Information on these Items Use Reply Card—Page 209

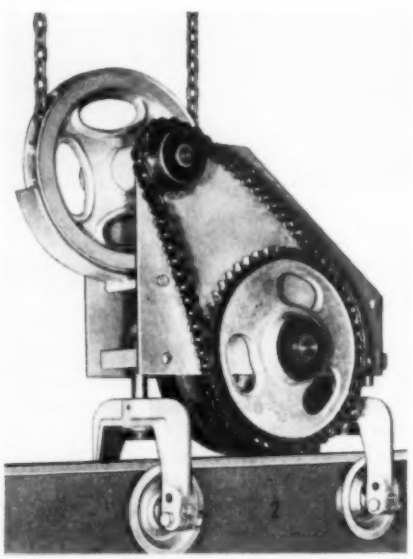
(1)—Belt Sander: Buckeye Tools Corp., 21 West Apple St., Dayton 1, O.—New air-driven belt sander is designed for use on all types of surfaces, whether concave or convex. It may be used for sanding wood, sheet metal and solid castings of iron, steel, brass, bronze, solder, aluminum and magnesium.

For More Details Circle No. 1—Page 209



(2)—Hand Drive Unit: American Monorail Co., 13104 Athens Ave., Cleveland 7—Drive unit for propelling monorail carriers along overhead track operates through simple hand chain and sprocket arrangement. Loads up to track capacity are moved along the track at the rate of 1 ft for each 28-in. overhaul of the hand chain. Normal movement of a 1-ton load on a monorail carrier may be made with a 10-lb pull at the rate of 100 fpm. Unit is applicable where electric power is inaccessible and where tractor movement of a monorail load is advisable due to high elevation of track, precision spotting of load or excessive weight.

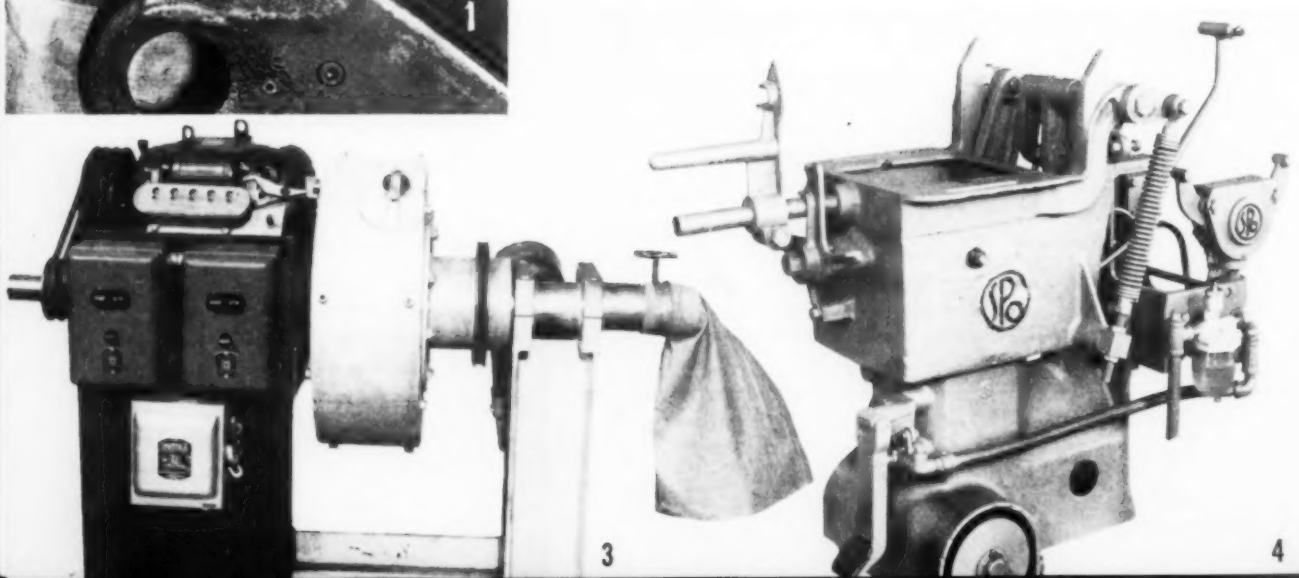
For More Details Circle No. 2—Page 209



(3)—Abrasive Testing: Alloy Metal Abrasive Co., 311 West Huron St., Ann Arbor, Mich.—Portable machine for testing abrasive materials is designed to produce an effect which compares with that experienced in actual blasting operations. The machine measures 2¼ ft wide, 4 ft long and 32 in. high and is designed to use a sample of 500 grams of representative material and a relative number of pounds of any other material to be tested, depending upon the specific gravity or cubical content of one pound. It is designed to test shot, grit, garnet, sand and aluminum oxide, apricot pits, corncobs or other material used for blasting operations in less than 30 minutes and to provide an accurate determination of the life of that material.

For More Details Circle No. 3—Page 209

(4)—Molding Machine: SPO Inc., 7500 Grand Division Ave., Cleveland 5—New jolt hand-rockover draw machine, in addition to the company's inverted jolt feature, em-



bodies internal jolt guides which protect the guides from sand; a power draw with two-speed control, automatic vibrator valves functioning in the slow draw speed, and automatically air-locked leveling bars. With an adjustable jolt blow cushion valve, it is said to be possible to jolt loads from a light tap to a hard blow.

For More Details Circle No. 4—Page 209

Recorder: Bristol Co., Waterbury, Conn.—Instrument records on a circular chart a curve of a number of operations against time. It records the total count of intermittent operations and the time at which each one occurs, and is used on production machinery to record work-producing operations or number of pieces produced. It also shows hourly rate of production, effect of fatigue on operators, variations in productivity between operators, effectiveness of job training programs, and the effect of variations in working conditions.

For More Details Circle No. 5—Page 209

Face Shield: General Scientific Equipment Co., 2700 West Huntingdon St., Philadelphia 32—Face shield is designed for protection in metal finishing, metal pouring, welding, woodworking and similar operations. Headgear is made of extruded plastic, fitted with sweat band and pivot assembly. Visor is made of fire-repellent, flexible, clear Plastacelle in three thicknesses: 0.02, 0.03 and 0.04-in. The 0.02-in. thickness also is available in light, medium and dark green. All are offered in 4,

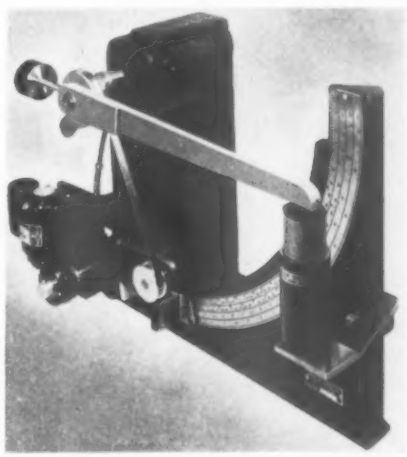
6 and 8-in. depths. Visors are 11 in. wide and have a wire reinforced gimp binding which enables the user to mold the shield to his requirements. Visor is attached to the outside of the spark deflector to withstand greater impact. Distance of visor from face is adjustable.

For More Details Circle No. 6—Page 209

Paint: Stonhard Co., 500 Stonhard Bldg., (F) 1306 Spring Garden St., Philadelphia 23—Specially created and prepared titanium dioxide paint for varied industrial use is a heavy, white semipaste that may be brushed or sprayed. It is said to have extreme whiteness and hiding power and may be applied to wood, concrete, plaster, wallpaper, brick or any other interior wall surface. Tints may be added as desired. Other features claimed are that it is resistant to fumes, mildew and moisture.

For More Details Circle No. 7—Page 209

Green Core Testing: Harry W. Dietert Co., 9330 Roselawn Ave., Detroit 4—Green core strength accessory for attachment to the company's universal sand strength machine is designed to improve the accuracy of the green compression test on relatively weak core sand. Loading is applied at a controlled rate by



the regular motor drive or by hand wheel. Specimen is stripped directly on the accessory to reduce air dry time and assure perfect seating on the support post. Breaking strength is found by multiplying the green compression scale reading by ten.

For More Details Circle No. 8—Page 209

Die Casting: Kux Machine Co., 3940 West Harrison St., Chicago—Vertical type cold chamber die casting machine is designed to be used in the production of parts which have inserts cast in. Die plates are mounted on the machine in a horizontal position and operate vertically. Thus, it is said, castings with inserts can be placed in the lower die half, and the inserts remain in place during the casting cycle without the necessity for specially constructed dies to hold them in place. The machine is hydraulically operated and electrically controlled, and will produce castings weighing up to 4½ lb in aluminum. Machine has a die space of 17¾ in. square between the bars.

For More Details Circle No. 9—Page 209

Tow Conveyor: Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4—Floor-type tow conveyor consists of a continuous chain equipped with

pusher dogs spaced at suitable intervals, running in a steel slot below the floor. A simple towing pin device is bolted to the end of a standard 4-wheel truck or trailer. Standard 2-wheel trucks may be used with a dolly. Trucks are set in motion by dropping the pin into the slot where it is engaged by one of the pusher dogs. Lifting the pin disengages the trucks which then may be wheeled away for loading or unloading. The chain, which is drop forged from high carbon steel and has an ultimate strength of 48,000 lb, may be looped around the area to be served and will tow loads up or down hill. It is equipped with ball bearing wheels which permit speeds up to 100 fpm.

For More Details Circle No. 10—Page 209

Intercom Systems: Wheeler Insulated Wire Co., 150 East Aurora St., Waterbury 91, Conn.—Communications systems have wall-mounted, self-powered telephones requiring neither batteries nor other power source for either the talking or ringing circuit. Operation consists of simply removing the handset from the hanger, pressing the ringing lever and talking to the person answering at the other end of the line. Equipment is said to be flame, explosion and fume proof, and to eliminate hazards originating from normally sparking electric communications equipment. The two-phone system is said to be effective up to 20 miles. The master station system permits the operator of the master phone to signal any one or all of eleven sub-

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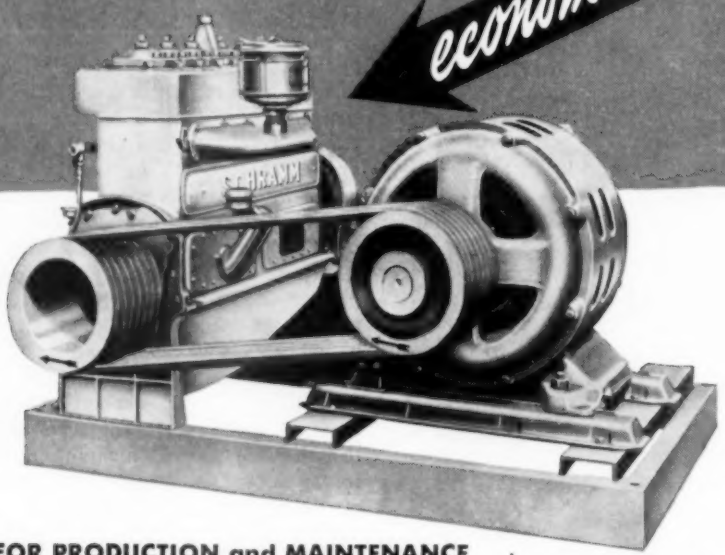

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stations and each of the substations can ring the master phone. Six stations can be operated on a "conference" basis. The third system consists of up to twelve master stations enabling users to ring any one or all other master phones on the system.

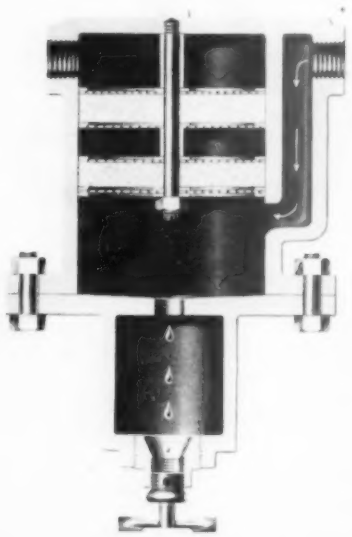
For More Details Circle No. 11—Page 209

Goggle: Chicago Eye Shield Co., 2336 Warren Blvd., Chicago 12—Goggle features molded thermoplastic cups engineered to fit both left

and right eye areas snugly yet gently. Cups have broad contact surfaces designed to eliminate pressure spots. Goggle is equipped with a molded rubber headband which has no buckles or sharp edges and is said not to kink, curl or twist. Patented slip-disk size adjustment is quick and simple. Goggle is available in various styles for chipping and welding protection.

For More Details Circle No. 12—Page 209

Separator: James A. Murphy & Co., Fifth & Vine Sts., Hamilton, O. —Separator is designed to remove oil, moisture and dirt from compressed air at the point of use. Unit is in-



stalled in the pipe line just ahead of the point of delivery; air enters at top right and is conducted to the expansion chamber below the strainer

(*Continued on page* 212)

HELPFUL LITERATURE

50. Portable Electric Tools

Independent Pneumatic Tool Co.—4-page illustrated circular JE1063 describes all models in Thor Silver Line of portable electric tools. Specifications, operating characteristics and list prices of impact wrench, drills, polishers, grinders and sanders are detailed.

51. Four-Way Air Valves

Gerotor May Corp.—20-page illustrated catalog section No. 301 covers 21 models in line of four-way air valves which are suitable for pressures up to 150 pounds per square inch. Circuit layouts for important types of control show arrangement of all necessary air equipment with description of complete sequence of operation.

52. Diamond Wheels

Raybestos-Manhattan, Inc., Manhattan Rubber Div.—36-page illustrated catalog on line of resinoid-bonded diamond wheels contains complete description of types, sizes, list prices and other data. Resin bond of wheels will not load or glaze when coming in contact with soft or hardened tool steel while grinding carbide tipped tools.

53. Removable Tip Core Drills

Scully-Jones & Co. — Illustrated leaflet "Triple Savings with Scully-Jones Removable Tip Core Drills" discusses long and stub series of removable tip core drills which are available in sizes 1½ to 3 inches in steps of 1/16-inch. Tips are furnished in solid high speed steel or Stellite tipped.

54. Compressed Air Cleaner

Logan Engineering Co.—12-page illustrated bulletin No. 1148 explains how Aridifier unit purges air and gas lines of moisture, oil, dirt, rust and fine scale by means of centrifugal force. It retains its initial operating efficiency indefinitely and creates little or no back pressure.

55. Industrial Scales

Toledo Scale Co.—Large illustrated folder form No. 2020-C shows and discusses scales for weighing, recording, controlling, classifying, balancing, counting, testing, batching and force-measuring. Among features explained are interchangeable and self-gaging pivots and full-floating platform which absorbs side impact and guards accuracy.

56. Protective Gloves

Edmont Mfg. Co.—12-page illustrated pocket-size catalog describes natural rubber, plastic and Neox-coated work gloves. They are available in knit-wrist, gauntlet and safety cuff styles with palm coated only or entirely coated.

57. Alloy Steels & Irons

Union Carbide & Carbon Corp., Electro Metallurgical Div.—12-page "Electromet Literature List" No. F-6924 summarizes company's publications on production, properties, fabrication and uses of alloy steels and irons. Ordering form to obtain any of the technical literature listed is included. One section is devoted to ferro alloys and metal in foundry production, properties of alloy cast irons and cupola operations.

58. Gas Burner

North American Mfg. Co.—4-page illustrated bulletin No. 58 describes gas burner and discusses how exact air-to-gas ratios can be set by means of pointer and dial arrangement. This insures positive initial light-up regardless of number of burners involved in installation.

59. Refractories

Chas. Taylor Sons Co.—16-page illustrated bulletin No. 202 discusses properties and applications of Zircon refractories which are recommended for construction of aluminum open-hearth melting furnaces; as crucibles for melting and refining platinum and similar alloys; and for glass, refining and chemical process industry where highly acid refractory having softening point above 3600° F is required.

60. Industrial Truck

Frank G. Hough Co.—12-page illustrated pamphlet form No. 187 presents data on HA Payloader truck for digging, loading, carrying, dumping, piling, mixing, windrowing, spreading, pulling, pushing and lifting operations. It has bucket capacity of 10½ cubic feet and static load capacity of 1000 pounds.

ADDITIONAL INFORMATION?

For additional information on any of the items described under "New Equipment and Supplies", "Trade Publications" or "Helpful Literature" in this issue — simply circle their corresponding item numbers on one of these cards.

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61. Ethyl Silicates

Carbide & Carbon Chemicals Corp. —4-page bulletin "Ethyl Silicates" discusses recent advances in controlling gelation of ethyl silicate during preparation of investments for precision casting.

62. Electric Hoists

Harnischfeger Corp., Hoist Div.— 20-page illustrated bulletin H20-4 reviews P & H Zip-Lift electric hoists in capacities from 250 to 2000 pounds. Cross-sectional view, clearance data, specifications, operating features, advantages and applications in materials-handling operations are included.

63. Aluminum Alloys

Apex Smelting Co.—16-page publication "Apex Aluminum Alloys" tabulates composition, typical mechanical properties and heat treatments of line of standard aluminum alloys. They are produced under laboratory control to insure uniformity of composition and physical characteristics.

64. Pneumatic & Hand Tools

Arrow Tools—44-page illustated catalog No. 9 presents details on line of hand and pneumatic tools including chipping hammers, pneumatic rivet sets and chisels for riveting hammers, pneumatic moil points, hand chisels and punches, drift pins, tongs wrenches, hammers and safety retainers for various tools.

65. Nonskid Conveyor Belt

B. F. Goodrich Co.—4-page illustrated folder "To Avoid a Slip— Griptop" presents information on Griptop conveyor belt designed for conveying materials at angles of incline too steep for conventional belts. Material is gripped by 1000 projecting fingers on each square foot of belt's surface.

66. Blowers & Exhausters

Lamson Corp.—4-page illustrated bulletin B-5-A deals with centrifugal type blowers and exhausters for handling air and gases of various densities, temperatures and chemical composition. General specifications and capacities of various models are related.

67. Sand Conditioning

Pettibone Mulliken Corp., Beardsley & Piper Div.—4-page illustrated bulletin No. 1315 depicts applications of models L, M and S Screenarator sand conditioners and lists their respective specifications.

68. Laboratory Apparatus

Precision Scientific Co.—32-page illustrated catalog No. 860NR describes line of laboratory apparatus and accessories for preparation of metallographic specimens. Included are Polmatic automatic polisher, Subcut submerged specimen cutter, Aeromount semiautomatic specimen mounting press and hand-operated mounting presses and polishers.

69. Backstand Finishing

Minnesota Mining & Mfg. Co.—16-page illustrated booklet "Step up Production" explains backstand method of grinding and finishing and shows grinding and polishing lathes, backstand idlers, abrasive backstand belt and contact wheels. Numerous photographs showing applications of method are included.

70. Protected Thermocouples

Elematic Equipment Corp.—4-page illustrated folder "Metalast Protected Thermocouples for Molten Metals" and price list present information on Metalast Speedy Junior thermocouples for readings in aluminum, brass, copper and similar materials and Metalast Speedy Standard tips for heavy-duty and semipermanent immersions in nickel silver, phosphor bronze and other high copper alloys.

71. Panel & Attic Fans

American Machine & Metals, Inc., DeBothezat Fans Div.—8-page illustrated catalog No. DF-8-48 describes Fan-Pac panel fans with direct motor or V-belt motor drives. Fan diameters range from 16 to 24 inches in direct motor driven unit and from 24 to 48 inches in V-belt driven unit. V-belt motor driven attic fans ranging in size from 24 to 48 inches in diameter are covered also.

72. Radial Saw

Walker-Turner Div., Kearney & Trecker Corp.—6-page folder No. 1009 illustrates and describes 900 series Centr-Pivot radial saw for wood, plastic and metal. Literature includes specificiations, applications and model listing. Also shown are standard components which are available for setting up high speed production line cutting.

73. Pump Drive

Stow Mfg. Co.—6-page illustrated folder describes flexible shaft pump drive engineered for tank truck service. Given also is alignment chart on how to determine proper shaft size for pumping liquids not exceeding viscosity of 650 Saybolt Seconds Universal.

74. Power Wheelbarrow

Kwik-Mix Co.—4-page illustrated catalog covers Moto-Bug wheelbarrow which is powered by standard 4-horsepower gasoline engine. Unit travels at speeds of 2 to 4 miles per hour both forward and reverse and has rated hopper capacity of 10 cubic feet or 1200 pounds on platform body.

75. Melting Furnaces

Bellevue Industrial Furnace Co.— 12-page illustrated folder entitled "Nonferrous Metal Melting Furnaces" lists various types of melting furnaces which can be obtained for this type work. Included are gas and oil fired tilting and stationary types, single and multiple burner models and types for special applications.

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YOU GET *Continuous* MULLER ACTION in a *Clearfield Mixer*

The operator here is inspecting the muller action on a model 930 Clearfield Mixer at work in the plant of the United Engineering and Foundry Company, Pittsburgh.

Because the mullers in a Clearfield Mixer are stationary in the horizontal plane with the mixer pan revolving under them, the sand is kept in violent motion every instant of the mixing period—and you get better prepared sand quicker. A star-shaped agitator, also continuously in operation, supports this outstanding muller action by preventing the formation of cakes and keeping the sand flowing freely.

There's a Clearfield Mixer to meet your every sand preparation need. Catalog No. 79 will give you complete details. Write for your copy today.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U.S.A.

Why You Find

SPENCER TURBO COMPRESSORS

in Foundries Everywhere

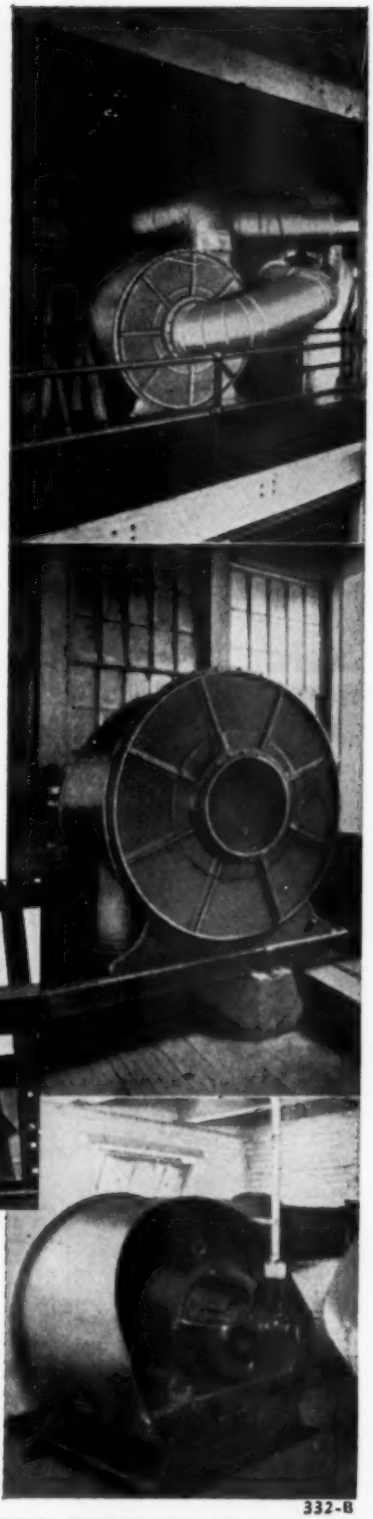
The principal reason why you find so many Spencer Turbos on cupolas is the reliability experienced over years of service.

Simplicity is the answer. One rotating element with wide clearances and only two bearings. Cast iron bridge construction and light weight balanced impellers mean minimum vibration, no special foundations and negligible wear even after years of service.

Hand or automatic blast gate control—any capacity required. Ask for bulletin No. 112.

AND SPENCER FOR CLEANING

The dust count is reduced, molds and patterns cleaned in modern foundries with Spencer Portable and Stationary Vacuum Cleaning Systems. Ask for the bulletins.



ASK FOR BULLETINS

Foundries	No. 112
Data Book	No. 107
Gas Boosters	No. 109
Four Bearing	No. 110
Blast Gates	No. 122
Technical Bulletin	No. 126

332-B

SPENCER HARTFORD

THE SPENCER TURBINE CO.

HARTFORD 6, CONN.

(*Continued from page* 208)

cartridge, where expansion and surface contact separates air and moisture. The air then rises slowly through two cotton felt absorbent pads, packed between perforated brass baffles. The pads are designed to trap remaining particles of oil, grit and moisture, and the dry, clean air is delivered for immediate use. Moisture is collected in a trap from which it may be drained off through a plug. Strainer cartridge may be removed, cleaned with solvent and reused. Additional felt pads are available. Unit is offered in two sizes: one accommodates inlet and outlet pipe sizes of ⅛ to ⅜-in. and delivers to one ⅛-in. pipe nozzle; the other accommodates inlet and outlet pipe sizes of ⅛ to ¾-in. and delivers by manifold to four ⅛-in. pipe nozzles or to two ¼-in. pipe nozzles.

For More Details Circle No. 13—Page 209

Work Positioner: Solon Foundry Inc., 1510 University Rd., Cleveland 13—Work positioner, made of heavy cast aluminum, is 5½-in. high,

weighs 1½ lb, and has table measuring 4 x 5¾ in. Unit is assembled at factory ready for use. Table is said to be adapted quickly for holding work that may be put to it. The handle provides proper tension in adjusting a job to any working position. Unit is well suited to use as a soldering base and angle plate.

For More Details Circle No. 14—Page 209

Temperature Indicators: Tempil Corp., 132 West 22nd St., New York 11—Crayon and pellet type compounds which, when applied to metals being heated, melt at a predetermined temperature now are available in the temperature range between 1600 and 2000° F. Crayons

(*Continued on page* 214)

Your Most Dependable Source of Merchant Iron Supply is WOODWARD

BECAUSE Woodward has the largest coal and ore reserves of any independent merchant iron producer in America.

BECAUSE Woodward has no definite commitments except to its foundry friends.

BECAUSE Woodward moulds its own policies as well as its own pig iron.

BECAUSE for 67 years Woodward has been engaged exclusively in the production of quality pig iron.

Woodward invites inquiries from companies seeking a dependable source of supply for uniform merchant iron.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1882

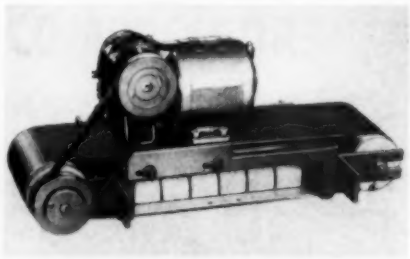
GENERAL SALES OFFICES—1515 First Nat'l Bldg., Birmingham, Alabama
Phone 4-6786

(*Continued from page* 212)

and pellets are available in 12½-degree steps from 113 to 400° F and in 50-degree steps from 400 to 2000° F. The paint form of temperature indicator is offered in similar intervals from 113 to 1600° F.

For More Details Circle No. 15—Page 209

Self - Cleaning Magnet: Dings Magnetic Separator Co., 4740 West McGeogh Ave., Milwaukee—Heavy-duty permanent magnet designed to remove contaminating iron from bulk materials can be installed over conveyor belts, spouts or chutes. Unit consists of the magnet and a



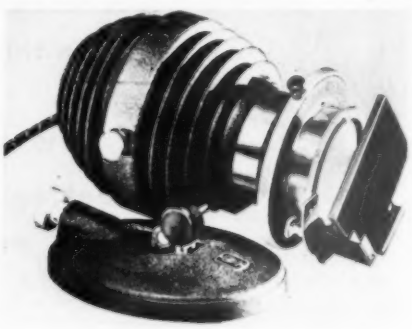
motor-driven, endless cross belt. The magnet attracts and holds tramp iron to the underside of the cross belt, which carries it to the side beyond the influence of the magnetic field, at which point it is discharged. The unit is said to be equally effective with wet or dry materials and the magnet itself can be completely submerged without affecting its operation.

For More Details Circle No. 16—Page 209

Conveyor Carriers: Stephens-Adamson Mfg. Co., Aurora, Ill.—Ball-bearing belt conveyor carriers feature one-piece welded steel frames designed to tilt in the direction of the belt travel and keep belt centered without need for guide rollers. Inverted angle base and specially designed end brackets shed material and keep rollers free. Additional features include lightweight construction, low power requirement, minimum maintenance, one-shot low pressure lubrication from either side of the carrier, and interchangeability of parts with no tools or adjustments required.

For More Details Circle No. 17—Page 209

Microscope Illuminator: American Optical Co., Scientific Instrument Division, Eggert & Sugar Rds., Buffalo 15—Microscope illuminator furnishes both Kohler and parallel illumination for bright field and phase microscopy, photomicrography, microprojection, and dark field illumination. All adjustments are external and located for user convenience. Ventilating fins on the die-cast aluminum body, coupled with natural draft ventilation, provide cool operation. Rack and pinion focusing adjustment is equipped with two buttons for focusing by left or right hand. A screw type tilting adjustment, operating in threaded nut, is placed low and to the rear of the base for handling coolness. Silvered, concave glass reflecting mirror is adjusted by three screws. A standard 100 w, 115 v bayonet base bulb is used. Unit may be obtained with or without an iris diaphragm which has both knurled ring and knob adjustments. A single filter holder for



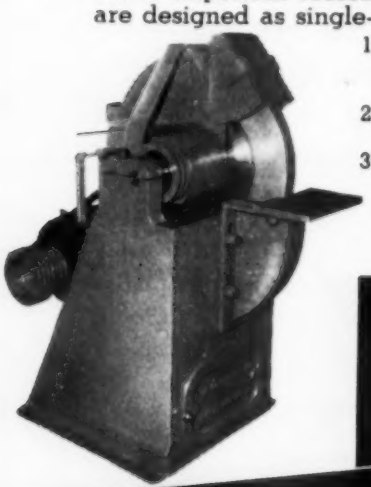
(*Continued on page* 216)

High-Speed PRODUCTION

FOR THE FOUNDRY

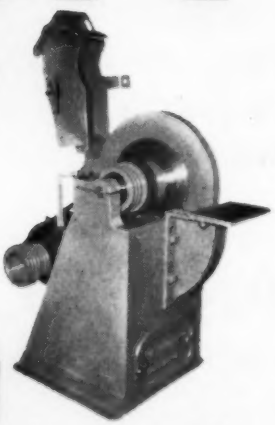
Three important reasons why FOX Grinders are designed as single-wheel machines:

1. Speed changes can be made at the proper wheel diameter.
2. Less space is required for each installation.
3. Proper operating room is provided on either side of the wheel.



FOX

HIGH SPEED
STAND GRINDERS

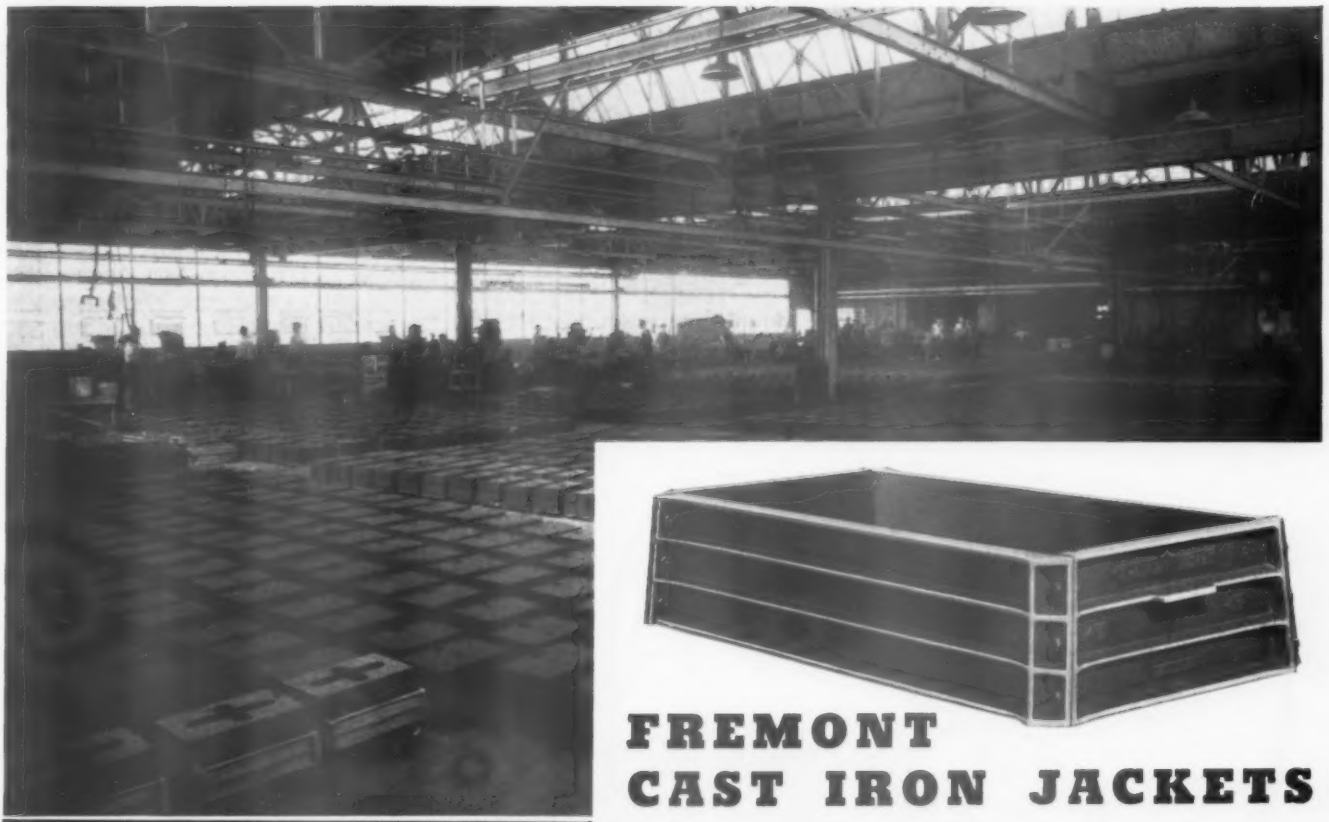


These Stand Grinders have been designed for use in foundries where high-speed production is required. Maximum clearance at the grinding face has been provided in both units to properly take care of the innumerable casting shapes encountered throughout the foundry industry.

Comes in 4 sizes: 20" light duty—24" light duty—24" heavy duty —30" heavy duty.

FOX GRINDERS, Inc.

OLIVER BUILDING PITTSBURGH 22, PA.



Wells Mfg. Co.'s new foundry in Skokie, Ill. Its 28,800 sq. ft. of floor is well covered by Fremont cast iron jackets and magnesium flasks. They're standard equipment.

FREMONT
CAST IRON JACKETS

FREMONT
MAGNESIUM FLASKS

BUILT FOR LONG SERVICE & FAST PRODUCTION

ALL ORDERS GIVEN VERY PROMPT ATTENTION

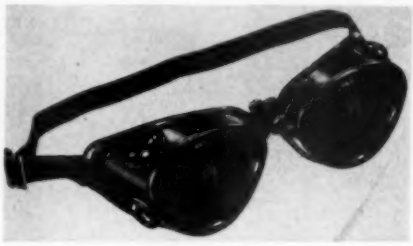
GROOVLOCK
THE FOOL-PROOF PIN

THE FREMONT FLASK CO.
Fremont, Ohio

(*Continued from page* 214)
either ground or blue glasses is available, also a multiple filter holder attachment which accommodates up to four rectangular filters simultaneously.

For More Details Circle No. 18—Page 209

Goggle: Willson Products Inc., 233 Washington St., Reading, Pa.—Welding goggle has cups of nylon plastic molded with rolled edges to reduce pressure around the eye socket. The lightweight material is said to have good compressive strength and impact resistance. Cups have screened indirect ventilating ports de-



signed to admit sufficient air to prevent fogging but keep out dust and flying particles. It is equipped with adjustable leather bridge and headband to give proper fit. Goggle also is available with direct ventilating ports and clear, impact-resisting lenses for chipping and other heavy duty work.

For More Details Circle No. 19—Page 209

Battery Charger: Westinghouse Electric Corp., 306 Fourth Ave., Box 1017, Pittsburgh 30—Copper oxide battery charger is suited for "on-the-spot" charging of industrial truck batteries. It features a saturable reactor control which is designed to provide smooth, easily made adjustment at output by variation of inductance. Use of a rheostat control, which can be adjusted while energized, is said to eliminate the necessity of constantly changing taps for high rate, low rate, aging and line voltage variation. Charging cycle is completely automatic after preliminary selection of the rate by turn of a dial. Charger may be obtained as a combination unit to charge either lead-acid or nickel-alkaline batteries; either type of battery can be fully charged in less than 8 hr, it is claimed.

For More Details Circle No. 20—Page 209

Fire Extinguisher: American-LaFrance-Foamite Corp., 10 East LaFrance St., Elmira, N. Y.—New fire extinguisher designed for flammable liquid or electrical fires discharges by the action of pressurized carbon dioxide gas a dry chemical which is said to be nontoxic, non-

corrosive, nonconductor of electricity, and nonfreezing. The dry chemical may be discharged through a rubber hose with the tank in any carrying position. The unit is easy to recharge without special devices or replacement parts, it is claimed

Photo at left: A cross section of unit showing discharge pipe (A), induction channel where pressure is created (B), pouring spout (C), and mold (D).

The large photo shows the Ajax-Tama Electromagnetic Pump at work. Control cubicle in rear maintains temperature, energizes pump from electric timer, electric eye, or similar devices.

Photo at right: Closeup of the pumping unit.

THE AJAX ELECTROMAGNETIC MOLTEN METAL PUMP*

Precision controlled pumping of molten metal is now automatic—with an Ajax-Tama Electromagnetic Pump. Hand ladles, tapping spouts, tilting equipment and siphons are things of the past.

Using electromagnetic pressure created by high current in the loof of an Ajax Twin Coil Unit, the molten metal is automatically controlled and channeled in one direction. From the bottom of the hearth (see cross section drawing) through an electrically heated refractory pipe, the pure metal is lifted to the mold. The flow is completely controlled by electric current.

Maintaining excellent weight accuracy, castings of from ¼ to 30 pounds, or more, can be poured in continuous operation. Special problems calling for a flow of hundreds of pounds per minute can also be handled by this same unit. The electromagnetic pump can be used as a reservoir to maintain molten metal at constant, accurate temperatures . . . for complete information contact Ajax.

* Patents applied for and allowed.

AJAX ENGINEERING CORPORATION
TRENTON 7, N. J

AJAX
TAMA-WYATT

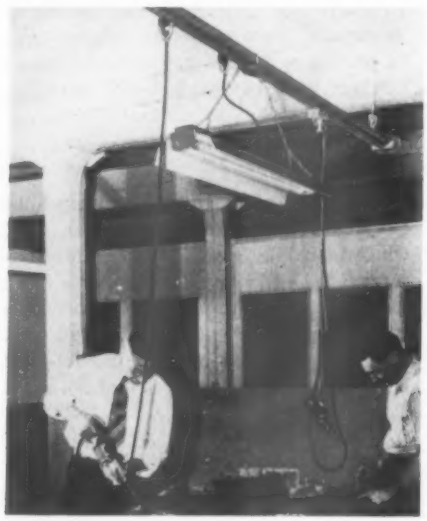
INDUCTION MELTING FURNACE

Associate Companies: AJAX METAL COMPANY, Non Ferrous Ingot Metals and Alloys for Foundry Use
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

Weight of the charged extinguisher is 42½ lb; weight of the charge alone is 25 lb. Effective discharge range is 20 ft over a 16-second interval.

For More Details Circle No. 21—Page 209

Trolley Busway: Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.—New busway, designed to provide both trolley power take-off and a continuous outlet for fluorescent lights and small power tools, offers 2, 3 or 4-pole construction with one compact housing. It is rated at 50 amp, 250 v, ac or dc,



and has two or more circuits that can be run in one housing and still be controlled separately. Plugs or trolleys are polarized so that loads may be balanced conveniently on both sides of the busway. It is built in standard fittings such as elbows and radium sections so that custom-engineered installations can be achieved economically.

For More Details Circle No. 22—Page 209

Crucible Tongs: Industrial Equipment Co., 115 North Ohio St., Minster 2, O.—Newly designed crucible tongs support a crucible in the same manner as a pouring shank, which avoids crushing or pinching the side walls, thereby reducing possibility of cracking pots. Tongs may be adjusted with a single screw to fit the crucible just below the bilge. Four pads on the cross arms suspend the pot firmly for lifting or carrying. A number of different styles in the new cradle type tongs are offered.

For More Details Circle No. 23—Page 209

Electric Saw: Independent Pneumatic Tool Co., 175 North State St., Aurora, Ill.—New portable electric saw is available in 6, 7, 8, 9, 10 and 12-in. sizes. Features include reinforced die cast aluminum housings; steel inserts for bearings and threads to maintain critical parts in permanent alignment; built-in saw blower; steel rip guide with adjustments for any thickness of material being cut; large switches, which are said to give positive protection against accidental starting; ball bearing blade guard with rubber snubber; finger tip control for depth and bevel cuts; complete ball bearing construction, and convenient handles for better balance and easier handling.

For More Details Circle No. 24—Page 209

Carbon Bricks: National Carbon Co., Room 1328, 30 East 42nd St., New York 17—Large size carbon bricks, measuring 3 x 6 x 13½ in., are said to be quicker to lay up, have fewer joints to cement, and to make a sound job. They weigh 14.4 lb and are said to be 20 to 45 per cent lighter than ceramics. Other features claimed are that carbon has no melting point and retains its strength at metal working temperatures. It is resistant to slag attack and immune to thermal shock. Additional new sizes of carbon brick

Ajax
shot
metals
for handy use in making modern alloys
SHOT COPPER . . . . . .
SHOT COPPER-NICKEL . . .
SHOT PHOSPHOR COPPER .
and other alloys
AJAX METAL CO., PHILADELPHIA 23, PA.
ASSOCIATE COMPANIES: AJAX ELECTRIC • AJAX ELECTROTHERMIC CORP. • AJAX ELECTRIC FURNACE • AJAX ENGINEERING

available include a key brick, measuring 3 x 5-6 x 13½ in.; a straight brick, measuring 3 x 6 x 9 in. and a key brick, measuring 3 x 5⅜-6 x 9 in.

For More Details Circle No. 25—Page 209

Temperature Control: Taco West Corp., Dept. NN, 515 North Noble St., Chicago 22—Time-temperature program controller for controlling temperature by predetermined schedules is housed in a box measuring 9 in. wide, 18 in. high and 8 in. deep, designed for flush or surface mounting. Upper section contains a modified electronic controller, having plug-in compartmented construction, high rating snap action control contacts, and featuring uniform control levels independent of line voltage variations. Lower compartment contains a synchronous motor-driven cam, which positions the control index arm of the controller automatically as called for by the cam contour. Safety clutches to safeguard the mechanical drive are integrally provided. A variety of standard and special scales, ranging from −300° F to +3400° F or centigrade equivalent are available and may be coupled with two positions, multiposition, or proportioning control systems.

For More Details Circle No. 26—Page 209

Grinding Attachment: R. G. Haskins Co., 2651 West Harrison St., Chicago 12—High-speed attachment steps up the speed delivered by the company's No. 2 and No. 4 flexible shaft machine at a rate of 2 to 1 (to 22,000 and 16,000 rpm, respectively). Unit is recommended for surface and up to 5-in. cavity grinding and polishing operations. It is said to facilitate grinding and polishing welds in hard-to-get-at places and to permit sensitive operation of small rubber and resinoid bond grinding wheels up to 2⅝ in. diam.

For More Details Circle No. 27—Page 209

Lift Trucks: Clark Equipment Co., Industrial Truck Division, 258 Champion St., Battle Creek, Mich.—A number of improvements have been made in the company's Clipper (illustrated) and Trucloader model fork trucks. The Trucloader model has been streamlined, the counterweight

made heavier, the steering column moved forward to provide more leg room, and lift and tilt levers relocated in the same positions as on other company trucks. The new Clipper has a capacity of 2000 lb with load center 24-in. from heel of the forks. A new engine provides 30 per cent higher brake horsepower and increased torque; oil sump and valve for operating hydraulic equipment has been improved, and greater strength and stability has been incorporated in the frame-steering-axle-engine assembly of this improved unit.

For More Details Circle No. 28—Page 209

Electric Tool: Smilan Tool Co., 2848 West Pico Blvd., Los Angeles—Portable electric tool is designed for drilling, sawing, filing, sanding, polishing, buffing and other specialized applications. Three separate spindles

(*Continued on page* 220)

ONE CUPOLA LINING LASTS
THREE TIMES AS LONG-IT'S BUCKEYE!
Buckeye Silica Firestone's high resistance to heat and abrasion results in much longer life for linings and patches in the melting zone of cupolas.
In many leading foundries, Buckeye has proved its superior ability to withstand severe conditions of long, continuous heats.
Because it is the best you can buy, Buckeye deserves your consideration. May we tell you more about its economy and efficiency?
BUCKEYE SILICA FIRESTONE
THE CLEVELAND QUARRIES COMPANY
1740 E. TWELFTH ST. CLEVELAND 14, OHIO
BUCKEYE
"FOR THAT EXTRA SERVICE"
SILICA FIRESTONE

PROOF OF SERVICE!

. . . serves to prove Federated First in the Non-Ferrous Field.

Each one of the ads above highlights a case in which the stamp "SERVICED BY FEDERATED METALS" means that a foundry was helped to cast a better product. And better products mean more customers!

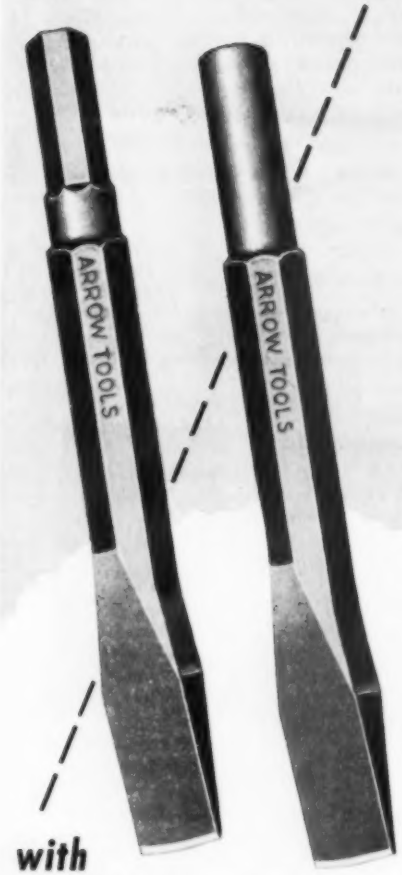
This same service . . . in the person of experienced field and research metallurgists . . . is yours for the asking when you buy from Federated. See Federated first for all non-ferrous metals and alloys.

Federated first in the non ferrous field FMD

Federated METALS DIVISION

AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N.Y.

MOST
for your money



with
ARROW TOOLS

Costs are reduced by economies in the plant, and chipping is no exception.

Arrow has been serving the foundries with good tools for 35 years, and now with our increased production, we are able to give you better tools at lower prices.

The finest alloy tool steel obtainable is used in Arrow tools. There is no stinting on quality.

Arrow tools are ready and waiting to serve you now. Write for your copy of Bulletin FM.

Blanks are available for those who prefer to make their own.

ARROW TOOLS inc.
1902 S. KOSTNER AVE., CHICAGO 23

(*Continued from page* 218)
project from the motor housing—two from the end and one from the bottom. The first provides for ¼-in. capacity drilling in metal or ½-in. capacity in hardwood. The second provides a reciprocating stroke of ⅜-in. length for hack sawing, filing and key

Automatic Proportioning Plow

Discharges Molding Sand from Belt

DESIGN for a new type automatic proportioning plow for discharging sand from a conveyor belt into molders' storage hoppers has been initiated by A. R. Young, Factory Specialty Corp., Detroit. The new plow is claimed to eliminate loss of time due to absence of sand in the hoppers, to reduce labor cost by as much as 50 per cent, and to eliminate sand spillage over the head pulley.

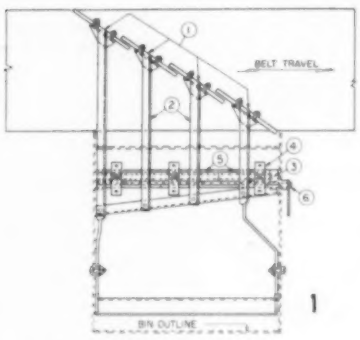
The first is accomplished by using a segmental plow comprising up to four segments, depending upon belt width (a 24-in. belt would use four segments). Each 12-in. segment acts as an individual plow, set at an angle of about 30 degrees to the travel of the belt, and is adjustable vertically up to 6 in. off the belt, so as to slice off as much sand as is required by each hopper. Plow arms are mounted on a rocker shaft with sleeves separating the arms. An eccentric lift assembly, actuated through a hand lever on the right, permits raising the plow segments clear of the sand on the conveyor. Fig. 1 shows detail of one of the units.

As soon as the bin is full the segments are raised automatically by a pressure vane in the hopper acting against a spring and lever which raises or lowers the plow blade. As the bin empties, the vane swings back, lowering the plow segments into the sand and diverting a greater flow into the hopper. That arrangement is shown in Fig. 2.

Sand spillage is eliminated by using the last hopper in the line (preferably one serving the heaviest machine) as the conveyor control. In this case, all segments rest on the belt with the pressure adjusted for a clean sweep. The pressure vane in this hopper operates a limit switch, arranged to stop the conveyor when the hopper is full.

For best results conveyor speed should be regulated so that delivery of sand to hoppers will approximate the amount required by the molding machines, thus obviating frequent stops and starts of the belt.

Each plow unit is adjusted vertically through handwheel and screw. Proper setting is made before operations start and is determined by the quantity of sand required in the hopper. Once set, no further adjustment is said to be necessary, and the automatic feature handles the line's functioning from there on. Fig. 3 shows arrangement of plows and hoppers along a conveyor belt.



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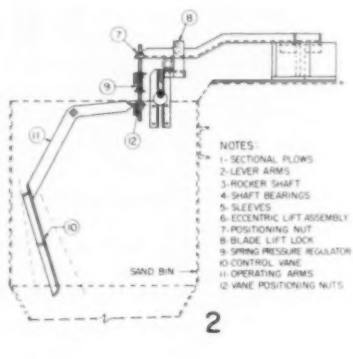

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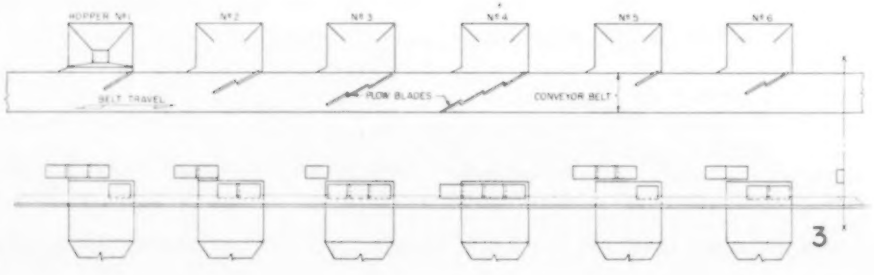


3

hole cutting, and may be adapted to jig sawing, reciprocating sanders, hammers, etc. The third and bottom spindle can be used for right angle drilling, sanding or buffing with disks or for wire brush applications. This spindle also can be used with a flexible shaft or adapter for circular saws. A ¼-in. Jacobs chuck is furnished which may be used interchangeably on all three spindles. Through a shift lever, gear reduction can be increased from 5 to 1, to 10 to 1. Spindle speeds of 1000 and 2000 rpm are available and instantaneous control of the 110 v, ac-dc universal motor is provided with a built-in trigger switch.

For More Details Circle No. 29—Page 209

Car Unloader: Markroy Co., Sixth & McCambridge, Madison, Ill.—Mobile car unloader employs a bucket type elevator of tubular steel construction and is said to transfer

bulk materials from hopper cars to truck or stockpile at the rate of 1½ to 2 tons per minute. Unloader consists of an elevator and a feeder unit. The feeder is installed beneath the rails and between two ties with 16-in. or more spread. It requires no concrete pit, the rail bed is not disturbed, and removal of the unloader during location or movement of hopper cars is unnecessary, it is claimed. The unloader, which may be powered by gasoline engine or electric motor, has a discharge height of 9 ft. The equipment may be operated by one man.

For More Details Circle No. 30—Page 209

Resin Sealer: General Electric Co., Chemical Dept., One Plastics Ave., Pittsfield, Mass.—Liquid resin for sealing porous, light metal castings has been developed to permit foundries to salvage castings which would otherwise be rejected because of porosity, and to permit their use on applications involving oil or vapor pressures. The polyester type resin converts to a tough, clear, solid, free of voids, through the action of catalysts and heat, it is claimed. Castings are sealed by vacuum impregnation and a subsequent short oven bake. The material is said to have good storage life under recommended conditions.

For More Details Circle No. 31—Page 209

Bar Solder: Federated Metals Division, American Smelting & Refining Co., 120 Broadway, New York 5—Fully automatic casting machines operating on the die casting principle are used by the company to produce bar solder. Advantages claimed include elimination of oxides in the metal because the solder is kept in a system closed to air during melting and casting, solders have improved fluidity and easier working properties, uniformity of composition, and nonsegregation of the solder elements. All commercial grades of bar solders are produced in a standard 1½-lb size. Half-pound and 1-lb bars will be available to consumers in the near future.

For More Details Circle No. 32—Page 209

"These Core Plates Handle Easily"

TRANSITE CORE PLATES are lighter, stronger, resist warpage.

Core makers can handle more Transite Core Plates at one time, thus make fewer trips. That means faster production with less fatigue and fewer accidents.

Transite Core Plates Last Longer—Made of fibrous asbestos and cement, they resist shock . . . are less likely to crack or break.

Clean Easily—Core wash, sand, etc. do not stick as readily as to other materials. Both sides are usable.

Resist Corrosion and Warpage—Surfaces stay smooth even after long service. Warpage is less than 0.1%.

Economical—Low price, low maintenance and long life add up to low cost.

To eliminate green cores and reduce baking time perforated plates are also available.

For full details, write Johns-Manville, Box 290, New York 16, N. Y.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville TRANSITE CORE PLATES MADE OF ASBESTOS

A METALLURGIST LOOKS AT

Steel Foundry Operations

(*Continued from page 79*)

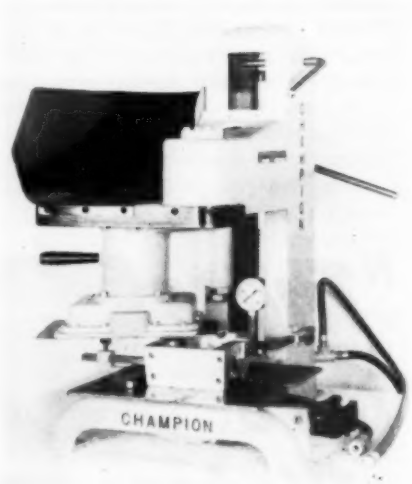
6. Electrodes.
7. Slag materials.
8. Miscellaneous, (small tools and similar items.)
9. Ladling costs, (a) Labor, (b) Materials, (c) Repairs.

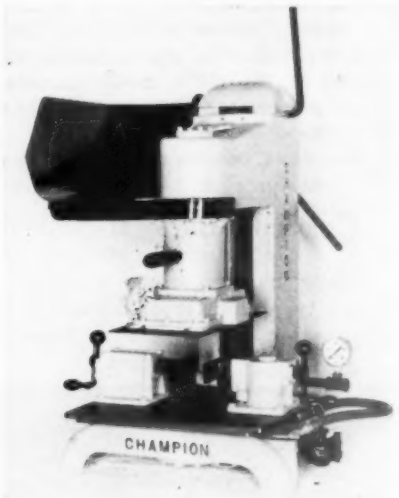
At the end of each month the cost of each item should be found and reduced to a cost per ton of steel poured. In this manner a basis of comparison will be established which will show any irregularity in practice and will offer suggestions for improvement. Changes in practice may then be studied from the cost angle and gradually a practice built up which will offer the greatest economy consistent with good quality. These records should be studied by all concerned with the idea in mind that they may be improved in succeeding months. It is indeed surprising what may be done in this direction when the idea is properly understood.

The men on the job should take pride in their ability to lower actual operating costs. In nearly every case where costs are reduced by better methods, materials or practice, the work is actually lessened and made easier. This is technological advancement and should be of benefit to all concerned.

To some extent the improvement of operating costs is a job of employer-employee relationship. No plan of management stands much chance of succeeding when it is not understood by the employees. It is human nature to mistrust that which is not properly understood and to fight against that which is mistrusted. Management should make every effort to see that its plans are properly understood. Rumor does a great deal of harm and a few well chosen words by

Core Blower Is Designed for Small Foundry





CORE blower designed for efficient operation in even the smallest foundry which produces duplicate castings has been developed by Champion Foundry & Machine Co., Chicago. The new machine blows cores up to 3 lb. Capacity, however, depends upon the sand mix, required blown density, contour of the core, and to the extent of venting in the core box.

The machine will handle core boxes equipped with side clamps up to 5 in. wide, 14 in. long and 7 in. high. Without side clamps, boxes 12 in. wide, 14 in. long and 7⅜ in. high may be accommodated. It is designed to handle all types of core boxes, with less than a minute required, in most cases, for changing from one type of box to another to handle different jobs.

In general, the machine may be operated on the foundry's regular sand mix, with cores being blown as fast as the operator can place and remove the core box. The blower operates on 85 psi air line pressure with the machine head serving as an air reservoir designed to provide instant and ample air volume. That design is said to provide the highest possible blowing efficiency in that the air passes directly from the air reservoir to the sand magazine when the core is blown.

The sand magazine is loaded by swinging it to the left under the send hopper, as shown above at left. The unit at right is equipped with air clamps. Movement of a single lever performs operations of clamping the box and blowing the core.

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management in the first instance will often overcome any premature mistrust and dispel the ever-occurring rumors.

During the recent war the author attempted to obtain from various foundries some idea of their costs in each of the several categories and in most cases was well received but unsuccessful as no complete breakdown was made of these costs. Some interesting figures were obtained which showed that costs varied a great deal in defferent foundries. In the matter of furnace roof costs, for example, figures were obtained which varied from a low of 21c to a high of nearly $6 per ton of steel poured. The lower figure compares favorably with large open hearth costs while the higher figure is excessive and shows what may be tolerated under wartime conditions.

Use Acid or Basic Lining

The small electric furnace (under 10 tons capacity) used in the production of steel for castings may be either acid or basic lined, the choice resting upon the analyses of steel produced and the scrap available. Reduction of sulphur and phosphorus is not possible in the acid furnace and unless a good grade of scrap is available the basic lining must be used. The basic lined furnace is a very flexible unit and may be operated in a manner of ways as conditions change. When high phosphorus scrap is used a slagging operation becomes necessary to reduce this element to a low level. When scrap conditions permit the furnace will not have to be slagged and may be operated with a single slag. One consideration is all-important, no matter the type of lining or the practice followed, a proper boil must be obtained. The melt down carbon must be high enough to allow a carbon boil to activate the metal and to flush out hydrogen and nitrogen. Dead melted steel is usually dirty steel and has unsatisfactory physical properties.

Electric furnace labor costs may be improved through greater efficiency and productivity. Consideration should be given to every means of speeding up operations by mechanical handling of materials. Time spent in patching and charging furnaces should be reduced to the minimum. In a properly lined furnace seldom if ever, should it be necessary to replace brickwork such as jambs or arches during the campaign. Substation maintenance should be so arranged that necessary repairs and replacements are made at a time when the furnace is not operating. Proper

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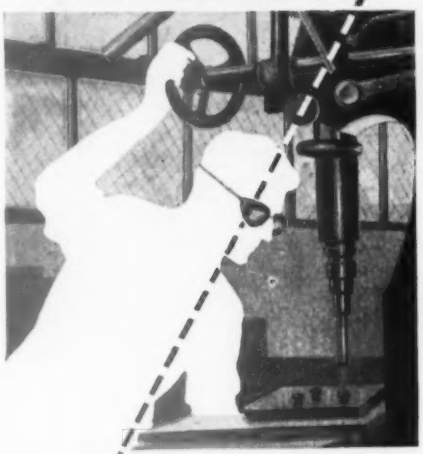

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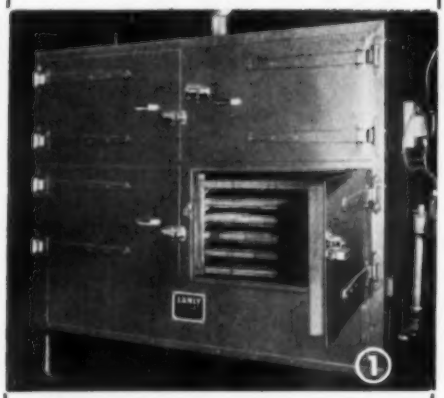
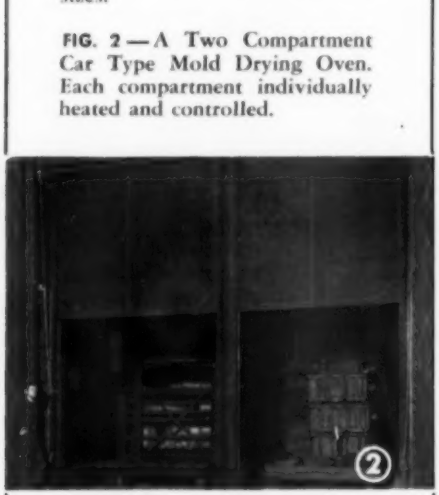


Typical LANLY Installations

FIG. 1—A Lanly Shelf Type Core Oven. This unit is heated by means of burners located directly under the work chamber. Available in several standard sizes.

FIG. 2—A Two Compartment Car Type Mold Drying Oven. Each compartment individually heated and controlled.



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maintenance of the electrical auxiliaries is an important item in electric furnace operation.

The author is in favor of the single lining for electric furnaces under 10 ton capacity. Furnaces may well be lined with the standard 9 x 3-inch brick if of very small sizes, or the standard 13 x 3 or 18 x 3-inch brick if the furnaces are over 10 tons capacity and not vastly overcharged. When lining furnaces with a single lining the first few courses of bricks may be set in two or three inches and the space so formed filled with one of the patented ramming mixes. This allows a little extra protection without sacrificing too much space.

The single lining facilitates and speeds up rebuilding, and enables relining to be carried out in the shortest possible time. When relining such a

Dot Welding Machine Developed

DOT welding recently has been introduced to the field of casting salvage. Said to be a near approach to true cold welding, the process is useful where added metal is required on castings and patterns, and for press fit build-up work. It also is adapted to repairing cracks in motor blocks, heads, industrial and marine engines, as well as boiler sections. Aluminum, nickel, copper, bronze and zinc may be deposited, and the welds are machineable.

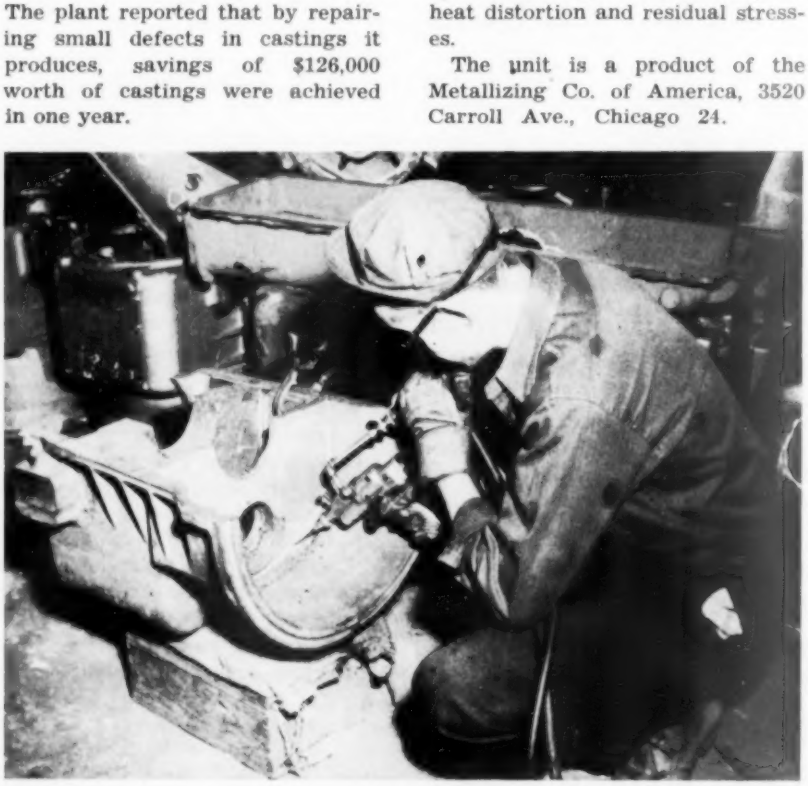
In salvaging castings the process may be used to fill in surface defects and shrinkage areas on gray iron, steel, malleable iron, bronze, and sand and die cast aluminum. To illustrate the savings made possible by salvaging operations, the company cites the experience of a manufacturer of sanitary ware and other castings that are finished by enameling. The plant reported that by repairing small defects in castings it produces, savings of $126,000 worth of castings were achieved in one year.

In pattern shops the machine has been used to add metal to aluminum patterns which have been damaged or which require minor changes in design. Worn corebboxes also have been repaired.

The technique utilizes a quench air weld machine of high amperage and low voltage, which operates on alternating current. Unit achieves a depth of penetration from 0.001 to 1/32-in., and a specially designed air pressure unit of the dot-weld pistol quenches the electrode and arc in a constant stream of cooling air.

The pistol also employs an air cylinder for producing a vibrating action which makes and breaks the arc so that the machine applies metal in a series of dots instead of a steady stream. That feature is said to reduce the danger of high heat volumes being developed in the base metal, thereby eliminating the possibility of heat distortion and residual stresses.

The unit is a product of the Metallizing Co. of America, 3520 Carroll Ave., Chicago 24.



furnace a definite procedure may be established as follows:

Having tapped the heat prior to relining, the electrodes are removed, water connections to the roof and coolers taken off and the roof removed from the furnace. The lining should then be carefully cooled with water, being careful to use only enough to cool the lining and bottom somewhat without causing damage to the permanent bottom. Having thus cooled the furnace somewhat a large circular piece of heavy steel plate slightly smaller in diameter than the furnace at the slag line, should be lowered onto the furnace banks where it will rest just about level with the furnace door. The old lining may then be knocked down on the plate and removed with hoes without having to enter the furnace. Most of the lining can be removed in this manner, after which, the steel plate may be removed. The remaining bricks may then be cleaned out, the bottom cleaned up and patched if necessary and relining started. After the lining is started and two or three courses of brick in place, the steel plate should once again be placed on the banks and covered with heavy planking to form a cool, level platform for the bricklayers.

Discard Small Door

Furnaces are usually constructed with a small door over the opening to the furnace spout, this can be done away with to advantage in most cases. Generally a much more satisfactory plan is to form the tap hole by inserting a 3 or 4-in. pipe in a manner similar to an open hearth furnace. The small door should be removed and replaced with a plate with a circular opening large enough for the pipe, this may be welded or bolted to the furnace. When lining the furnace an opening should be left for the pipe and the pipe inserted and packed well around the outside with ramming mix. As the lining is used the pipe will wear away eventually and the opening become larger when the pipe may be easily replaced and repacked.

The use of this method offers a number of advantages, the opening is small and may be easily filled with a shovelful of dolomite thus keeping unwanted air out of the furnace. If it becomes necessary to charge extra large heats, the opening may be filled and the furnace tapped like an open hearth furnace. When tapping such a furnace it may be tilted quickly until the slag is above the top of the opening and so maintained until most of the heat is in the ladle thus avoiding the intermixing of slag and

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125 pounds metal @ .20 lb.	25.00	625 pounds metal @ .20 lb.	135.00
Cleaning cost at .026 lb.	3.25	Cleaning cost at .026	16.25
Shrinkage 6%	1.50	Shrinkage 6%	8.10
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* Frame should not be included as it can be used for other jobs.

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steel to any large extent.

In the basic furnace the use of metal-cased magnesite brick has much to recommend it. Thermal and mechanical spalling are reduced and the lining operates cooler and fluxes less. When building arches, consideration should be given to the use of wedge shapes rather than the usual arch shapes. Silica arches are not generally satisfactory in small electrics which are basic lined. With the use of metal-cased wedge shapes for the construction of arches, a double or triple arch may be constructed and even though the inner courses gradually fail as the lining becomes progressively thinner, the course next to the cooler seldom fails and should last the life of the lining.

Meet Extreme Conditions

Electric furnace roofs operate under extreme conditions of temperature and chemical attack. Silica bricks are almost universally used and while not altogether satisfactory, do the required job at reasonable cost. The use of standard 9 or 13-in. silica bricks for roof construction is generally satisfactory. The use of standard sizes makes some cutting necessary when constructing roofs but this is a small matter.

Actual operating practice is the greatest factor in obtaining good roof life and consequently reasonable costs. Demands on roofs are particularly severe in foundries pouring castings of thin sections from hand shanks. Furnace roofs are heated largely by reflection and it is quite possible to ruin a roof in two or three heats by bad practice. A thin, clear slag carried on the metal at excessive temperatures will soon start to melt the roof causing silica drip and icicle formation. Such a condition never should be tolerated.

Of great importance in producing reasonable roof costs is the proper scheduling of roof replacement. A new roof placed on a red hot furnace may lose as much as 50 per cent of its value by excessive spalling. If the roof is replaced when the furnace is black, spalling will not be experienced even though a heat is melted immediately. It does not seem to matter how fast a roof is heated on a cold furnace, the charge protects the roof until it is warmed up and spalling does not take place. This bears out the experience of others regarding the service behavior of silica brick[1].

During experiments to find the best materials and methods for constructing furnace roofs for basic lined furnaces a trial roof of sillimanite shapes was used on a 1½-ton Heroult furnace. This was a most interesting experiment, the sillimanite roof lasted a total of 379 heats totaling 728 tons. It did not quite compete with roofs of standard 9 inch silica bricks in the matter of costs but a number of interesting observations were made which led the author to believe that in some cases its use would be justified.

The sillimanite roof failed by gradual spalling of the center portion. Apparently a layer of fluxed material was built up on the inside roof surface which had a different coefficient of expansion than the sillimanite itself. This layer spalled off when it reached a definite thickness, which occurred every 30 or 40 heats and continued until the center portion failed. With the sillimanite roof on the furnace operation was definitely easier, less lime was required for slag formation and metal temperature more easily obtained. In general operation was very satisfactory and no doubt in some cases with foundries experiencing difficulties with silica roofs the use of sillimanite roofs would be justified.

Basic Steel Is Fluid

At one time it was considered impossible to obtain fluidity in basic electric steel comparable to acid electric steel. This is a complete fallacy. Under proper operating conditions, with considerations given to the various factors, basic electric steel may be produced which is equal to any acid steel ever made. The author has produced hundreds of heats which were poured from hand shanks into green sand molds to produce castings with sections as thin as ⅛-in., without the slightest difficulty.

The factors controlling the ability to produce fluid steel in the basic electric furnace are (1) the furnace should have adequate power and not be vastly overcharged. (2) A proper boil is essential. (3) The reducing period should not be prolonged as there is a danger of the steel reaching the condition known as over-reduced when it becomes sluggish and when cast will be generally unsatisfactory. If these conditions are watched and reasonable care taken by the melter no difficulty should be experienced in producing a steel which will be exceptionally fluid, cast nicely, have good surface and excellent physical properties.

A small degree of ladle deoxidation is required when tapping steel at such extreme temperatures to overcome the oxidation produced when the steel is poured into the ladle. The author found that for the normal

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range of foundry steels that a ladle addition of 2 lb of aluminum plus 3 to 4 lb of calcium-manganese-silicon per ton of steel gave the greatest combination of good physical properties and maximum fluidity and castability. Any lesser amount of aluminum may tend to the formation of a grain boundary type inclusion with a consequent loss of ductility[2].

Steel furnaces should have ample power for the greatest production, an under-powered furnace is a curse to operate and difficult to control. With reference to ample power it might be well to consider the use of single-phase transformers when installing new transformer capacity. With those, a separate transformer with ample capacity on each phase, operations in case of trouble, may be continued with only two transformers by connecting them in an open-delta circuit. While this reduces the available power somewhat, the furnace may operate if necessary at a somewhat reduced rate, provided sufficient transformer capacity is available. Normal power consumption for a basic furnace should not exceed 640 kwh per ton of steel produced. Any greater consumption is an indication of poor operating conditions. A good operator will control the use of power to suit the desired conditions, and power should not be wasted.

Separate Charge Materials

In the average steel foundry the melter will have to operate with about 50 per cent foundry returns and 50 per cent purchased scrap. Where different alloys are cast it becomes essential to keep risers, gates and sprues in several categories to avoid the mixing of alloy steels with plain carbon steels and to obtain the greatest possible recovery of expensive alloys. Of the purchased scrap care must be taken to avoid the charging of excessive amounts of malleable or cast iron and also alloys containing lead.

For best operation the furnace should be so charged as to produce a melt-down carbon content about 30 to 50 points above the desired finishing carbon to allow a proper boiling period without excessive oxidation of the metallics. Such a boil is essential to clean steel with good physical properties. Ore may be charged with the scrap or after the melt down is complete. In some cases with very rusty scrap no ore will be required and it may be necessary to charge coke or old broken electrodes and nipples to create the necessary carbon boil. It does not require a violent boil to produce the desired results, indeed a quiet

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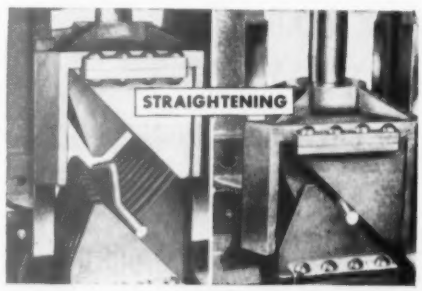

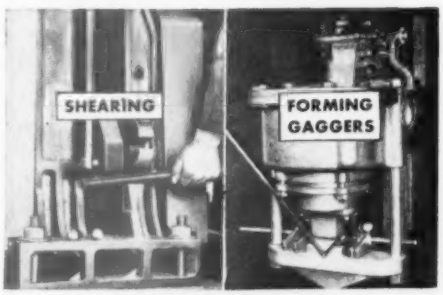

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easily controlled boil is to be preferred, and produces the desired effects.

Graphite electrodes are usually used in preference to carbon electrodes because of their greater conductivity. Graphite electrode consumption should not exceed 10 lb per ton of steel produced including breakages. Here again proper consideration of charging and melting will reduce costs to a considerable extent. Improper charging causing electrode breakage and delay is an expensive and time-consuming operation. Broken electrodes are difficult to remove from a furnace and are usually a total loss. Continued breakage may add a great deal to furnace operating costs.

The non-metallics usually used are limestone, burned lime, fluorspar and coke breeze. Small furnaces usually are operated with only burned lime but the larger furnaces may use limestone to advantage. If the operating practice is skillful a mininum amount of non-metallics will be required. Some special practices make use of calcium carbide or aluminum in place of coke breeze, their use being confined to certain special practices which claim to produce superior results.

Steel May Be Ruined

Ladling is not given the consideration it deserves in the production of good steel. Perfectly good steel may be ruined by improper or careless ladle practice. Good ladle practice is largely a matter of good workmanship, and with ladlemen sincerely interested in their work little trouble should be encountered in this operation but this is not often the case. In this connection the ladlemen should be considered skilled workmen and treated accordingly. They should be impressed with the importance of their work, which after all, is of great concern to the steel foundry trying to get the greatest possible returns at the least possible cost. For the actual ladling a choice must be made of bottom pouring, lip-pouring or teapot ladling. With the exception of Hadfield's manganese steel most analyses are much better bottom poured. Ladle refractories are not altogether satisfactory, life is comparatively short, and in some cases lead to unwanted inclusions in the steel.

The author found that for ladles up to five or six tons that a rammed monolithic lining of a patented mix of highly siliceous clay gave much superior results to the common firebrick lining. This material was rammed into place around a steel form inserted in the ladle, a thickness of 5 to 6 in. was rammed in 3 or 4-in. layers, after which the form was removed and the lining dried by careful firing for several hours. This material outlasted brick four to one and in addition had a cheaper first cost. No unwanted inclusions were produced and the linings were much more satisfactory in every respect. Ladling costs were greatly reduced and the practice was improved in every respect.

One special ladling problem is encountered when pouring Hadfield's manganese (13 per cent) steel. This steel cannot be bottom poured successfully but must be either lip-poured or teapot ladled. Due to the very strong reducing characteristics of this steel the usual acid ladle lining is not at all satisfactory. Chemical reactions at the interface between the liquid steel and the acid lining lead to unwanted inclusions and increasing silicon content of the steel[3].

Use Basic Lined Ladle

The answer to this special problem is to use a basic lined ladle. A rammed lining of basic ramming mix is very satisfactory. Five or six inches of this material forming a monolithic lining will last 60 to 75 heats and produce superior results. When lip pouring from a ladle lined in this manner the slag may be skimmed from the ladle and no further slag will rise to plague the pouring which will be very clean. Care must be exercised to remove completely the slag from the ladle lining every five or six heats as a thin layer of steel will form under the slag and lead to skulling if it is not removed. Thin spots may be patched with the same material until the whole lining becomes too thin for further use. It should be mentioned specially that the practice of mixing fireclay and magnesite as sometimes used, is just about the worst combination that could be used for a ladle lining. No justification can be made for this practice.

It is only with constant attention to the myriad of detail that a good practice is achieved and maintained. It requires the whole-hearted cooperation of all concerned to produce the best results and if each and every man is conscious of his part and responsibility foundry operation may become a much more efficient operation with benefits to all concerned.

The author welcomes any and all criticism of the views and ideas expressed herein. He believes that "the foundry is a good place to work" but is of the decided opinion that it could be a much better place to work if

some of the ancient practices and theories are discarded. A new approach is needed and becomes an absolute necessity in view of the progress made by some of the other phases of the metal working field. Some progressive foundries are truly making great strides in this direction but it must be considered essential to every small foundry if it is to compete in the coming buyers' market.

References

1. Smith, L. A., "Factors in Service Behavior of Silica Brick," *Blast Furnace & Steel Plant*, June, 1948, p. 701.
2. Sims, C. E. and Dahle, F. B., "Effect of Aluminum on the Properties of Medium Carbon Cast Steel," *Transactions* AFS 48, p. 106-108, (1938).
3. Post, C. B. and Luerssen, G. V., "The Interaction of Liquid Steel with Ladle Refractories," *Transactions* AIME, Vol. 1, Jan., 1949, p. 15-26.

DEOXIDATION OF WHITE CAST IRON

(*Continued from page 78*)

graphitization becomes active.

The effects of deoxidation on second stage graphitization of white cast iron have not been investigated by the author. This phase of the malleabilization heat treatment should be examined in relation to deoxidation treatments.

Precautions—The effects of deoxidation treatments of white cast irons are reproducible in the laboratory and have been applied to several different compositions. However, certain points should be considered in attempting to reproduce the results. The effects of a given addition of deoxidizer are, of course, determined by the extent of its reaction with oxygen and the percentage of the deoxidizing element remaining in the iron. The actual oxygen content of the melt may fluctuate widely unless a standardized melting practice is employed. Other items of importance are the rate of heating to the first stage graphitizing temperature, casting section size, composition, etc. Hydrogen in the iron from any source, will also affect the results. However, with reasonable control of these variables it is possible to reproduce the effects described in the foregoing paragraphs.

Probably the greatest single factor which would require cautious use of deoxidizers in white cast irons lies in the variable oxygen content which may be present. From Fig. 5 it appears that this variation may be considerable. Obviously the effect of a given percentage of deoxidizing addition, for example in the range of 0 to 0.05 per cent, will be quite different when the metal contains 0.004

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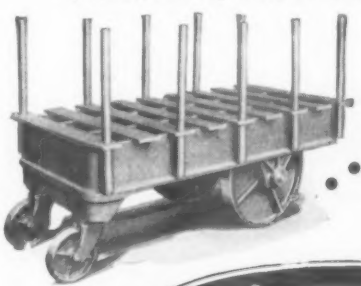

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per cent oxygen than when 0.10 per cent is present. Lower percentages of oxygen would shift the time of first stage graphitization and nodule number curves to the left while higher oxygen percentages in the metal would shift these same curves to the right. This effect could be quite pronounced depending upon the oxygen percentage introduced into the metal by the melting practice and materials employed in a particular foundry. When melting practices are not completely standardized, the metal oxygen content from heat to heat may fluctuate considerably, making it difficult to obtain reproducible results from a deoxidation practice.

The writer would like to make it clear that the results reported apply particularly to the condition of oxidation reached in his melting practice. The percentages of deoxidizing additions referred to in subsequent paragraphs would be lower for less oxidized irons and higher for more oxidized irons and should be considered relatively on this basis.

Summary—Deoxidation treatments applied to white cast irons have been shown to affect some fundamental phenomena of the malleabilizing process. The number of graphite nuclei developed during first stage graphitization are markedly affected by the amount and kind of deoxidizing addition. The time required for the first stage graphitization is decreased by deoxidizing treatments when the element added functions primarily as a deoxidizer. Residual percentage of carbide stabilizing elements promote resistance to graphitization. As a result of the effects produced when white cast irons are treated with deoxidizers, it is concluded that oxygen in the forms in which it exists in white irons promotes resistance to graphitization.

(To be concluded next month)

Bibliography

1. "Silicon-Oxygen Equilibria in Liquid Iron;" C. A. Zapffe and C. E. Sims. AIME—Metals Technology, Vol. 9, No. 6, Sept. 1942.
2. "Silicon Monoxide;" C. E. Sims and C. A. Zapffe. *Iron Age*, Jan. 22, 29, 1942.
3. "Factors Involved in Superheating Gray Cast Iron and Their Effects on Its Structure and Properties." *Transactions*, American Foundrymen's Association. Vol. 52, 1944, p. 113-158. A. W. Schneble and J. Chipman.
4. "A Study of Hydrogen, Oxygen, and Nitrogen Contents of Foundry Pig Irons." Hurst and Riley. *Journal of the Iron and Steel Institute*, Vol. 159, part 2, June 1948, pp. 130-136.
5. "Some Effects of Deoxidation Treatments on the Graphitization of White Cast Irons." *AFS Preprint* 49-8. R. W. Heine.
6. "Chemical Composition of Malleable Iron." H. A. Schwartz. *Transactions*, American Foundrymen's Association. Vol. 54, 1946.
7. "Effects of Boron Addition on Malleabilization of White Cast Irons." J. E. Miksch, H. A. Fabert, and G. M. Cover. *American Foundryman*. August 1948, Vol. 14, No. 2.
8. "The Relative Deoxidizing Power of Boron on Liquid Steel and the Elimination of Boron in the Open Hearth Process." R. W. Gurry, *Metals Technology*, December, 1943, T. P. 1641, Vol. 10, No. 8.

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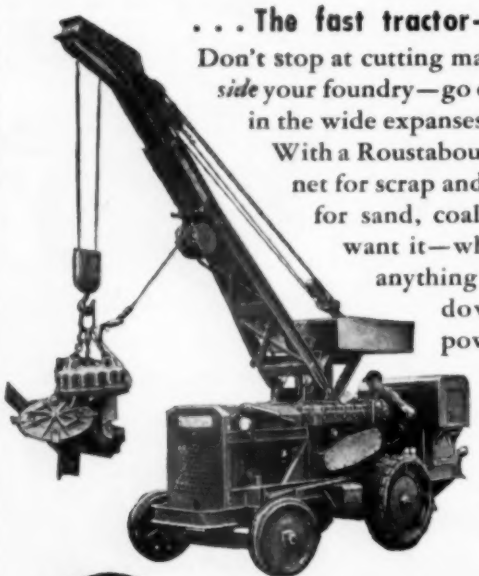

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Insulation of Risers

FOR FERROUS CASTINGS

(Continued from page 71)

uninsulated riser contained a shrinkage cavity. When, as shown in Fig. 8, the size of the test casting was increased to a 5 in. cube and the riser height increased to 5½ in. same comparative results were obtained. Although a crack in the refractory wash permitted the molten steel to penetrate the insulation, this did not impair the soundness of the casting. On a 5.3 in. cube, Fig. 9, the 3 in. diameter by 5½ in. high riser still proved adequate when insulated.

The sectioned casting and riser at the left of Fig. 10 was a 6 in. cube adequately fed by an insulated riser 4 in. in diameter and 5 in. high. In this case the contact was reduced to make a "knock-off" riser. At the right of this figure is shown a similar casting fed by a much larger sand-enca ed riser 6 in. in diameter, 5 in. high. In this case the shrinkage extended into the casting.

Calculate Riser Size

J. B. Caine[3] described a method of calculating the minimum riser required to feed any given casting. Dimensions of the minimum sand risers which can feed the block castings described previously have been calculated according to this method, assuming that an efficient pipe eliminator was used on the risers. Table I compares the volumes of these sand risers with the volumes of the insulated risers which adequately fed each of these castings. In all cases, when the riser is insulated it can be reduced to half of the volume of the smallest riser which would be effective in sand-molding practice.

An area of higher carbon content has been found in many of the castings under the base of the insulated risers. The carbon content in these segregated areas exceeds the base metal by 0.40 to 1.00 per cent. It is believed that penetration and reaction with the sawdust by molten steel is responsible since a direct path of high-carbon material from a break in the silica wash to the riser and casting interior was traced on one sample by sectioning and etching. When the silica coating was not penetrated, no high-carbon areas were found.

A transverse section of an eight-sided casting, Fig. 11, which was bled approximately one minute after pouring, shows the relative insulating characteristics of the saw-dust mix-

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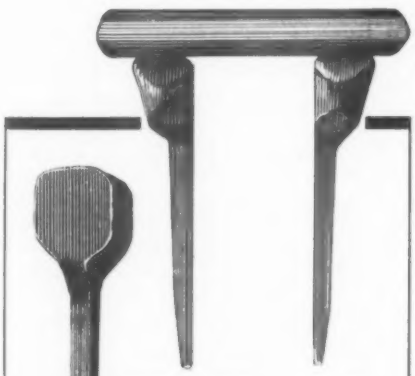

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ture to other materials. Wall No. 1 was cast against a steel chill, No. 2, an oven-dried oil-sand core, No. 3, green-sand facing, and No. 4 a sawdust insulating slab. The other sides of the mold were faced with molding sand. Navy Grade-B steel was poured into this mold at 2900° F, allowed to remain for one minute, and then the mold was inverted to allow the unsolidified metal to drain out. The contrast between the thickness of Wall No. 1 which was cast against a steel chill and Wall No. 4 which was cast against a slab of sawdust insulating is great. The thicknesses of Walls No. 2 and No. 3 was approximately midway between the thicknesses of the walls cast against the steel chill and against the sawdust insulation.

Summary: A mixture of sawdust, dextrine, and water pressed into hollow cylindrical sleeves, baked, and coated with a refractory wash, has the following advantages and disadvantages when used to insulate riser cavities on gray iron and steel castings:

Advantages

1. Sleeves greatly reduce the volume of metal needed to feed castings adequately.

2. Ingredients are inexpensive, readily available, and easily formed into shape.

3. Sleeves are strong enough to be rammed into position in a sand mold.

Disadvantages

1. An undesirable concentration of carbon will often occur in the steel within the casting.

2. Since the sleeves absorb moisture slowly from green sand and are then subject to a harmful reaction, they must be used soon after being placed in this molding material.

3. Gases and heat evolved from these sleeves in use increase foundry ventilation requirements.

4. Materials described in this report have been limited to research applications and have not been tried on service castings or on a large scale.

Bibliography

1. Taylor, H. F., and Wick, W. C., THE FOUNDRY, 73, 88-93, October 1945.
2. Report of the Steel Castings Research Committee, First Report of the Foundry Practice Sub-Com., Iron and Steel Institute (Br.) Paper No. 12/1945, February 1945.
3. Caine, J. B., "A Theoretical Approach to the Problem of Dimensioning Risers," 1948, AFS Preprint No. 48-36.

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James R. Power, the author, formerly was a member of the staff of the Naval Research Laboratory, Office of Naval Research, Washington.

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For More Details on these Items Use Reply Card—Page 209

CORE BAKING: Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y.—A series of data sheets on the electronic corebaking process are being made available once a month. They will contain technical and production information. The first two deal, respectively, with "Fundamentals of Electronic Core Baking" and "Resin Core Binders."

For More Details Circle No. 90—Page 209

TURRET LATHE: South Bend Lathe Works, 299 East Madison St., South Bend 22, Ind.—Catalog 67-F describes the company's No. 2-H precision turret lathe which incorporates a number of improvements and refinements. The illustrated catalog contains descriptive literature, specifications and a list of attachments and accessories.

For More Details Circle No. 91—Page 209

DIELECTRIC HEATING: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee—Bulletin discusses high-frequency dielectric heating and portrays its application in industry. Specifications and dimensions of dielectric heaters are given along with a description of such auxiliary equipment as electronic sealers and R-F voltmeters.

For More Details Circle No. 92—Page 209

BERYLLIUM COPPER: Beryllium Corp., P. O. Box 1462, Tuckerton Rd., Reading, Pa. — Bulletin 11 makes available complete data on the use and cost-saving possibilities of precision cast beryllium copper for industrial and novelty parts. Processing techniques are discussed and typical physical and mechanical properties listed.

For More Details Circle No. 93—Page 209

ARC WELDING: Hobart Brothers Co., Hobart Square, Troy, O.—Catalog contains illustrations, descriptions, dimensions and specifications on the company's complete line of arc welders. Also listed is a high frequency stabilizer attachment for use with any standard alternating current transformer type welder of 500 amp or less.

For More Details Circle No. 94—Page 209

ALLOY CASTINGS: Electro-Alloys Division of American Brake Shoe Co., Taylor St. & Abbe Rd., Elyria, O.—Folder features two charts intended to help in selecting the correct alloy for castings subject to corrosive conditions. Included is a list of corrosion-resistant alloys with their nominal composition, mechanical properties and descriptive remarks.

For More Details Circle No. 95—Page 209

WEIGHT PRINTER: Yale & Towne Mfg. Co., Philadelphia Division, 4530 Tacony St., Philadelphia 24—Bulletin P1135 dealing with a weight printer for use with a scale explains how it operates, what functions it will perform, how it is constructed and what models are availabl to perform a particular job. Full size examples of printed weights are included.

For More Details Circle No. 96—Page 209

HOISTS: American Chain & Cable Co., Wright Hoist Division, 929 Connecticut Ave., York, Pa.—Folder DH-65 describing the company's new line of electric hoists includes action photographs, illustration of each type of hoist, cross-sectional view of the hoist frame and complete specifications.

For More Details Circle No. 97—Page 209

BATTERY CHARGERS: Electric Products Co., 1725 Clarkstone Rd., Cleveland 12—Bulletin 234 describes single circuit motor generator battery charging equipment for automatically charging industrial batteries. Tabular data is listed for the lead-acid battery charger and Edison battery charger.

For More Details Circle No. 98—Page 209

STRAIN GAGES: Baldwin Locomotive Works, Testing Equipment Dept., Philadelphia 42—Bulletin 279 describes types of gages available for determining stresses and strains in structures and parts in service or when subjected to stresses in the laboratory. Various applications of the gages are illustrated.

For More Details Circle No. 99—Page 209

CUPOLA COLLECTORS: Claude B. Schneible Co., 2827 25th St., Detroit 16—Bulletin 449 explains operation of a water curtain type cupola collector. Installation pictures and diagrams are labeled, showing typical arrangement of units and their functions. Tables showing dimensions and capacities are included .

For More Details Circle No. 100—Page 209

LOCOMOTIVE CRANE: American Hoist & Derrick Co., 63 South Robert St., St. Paul 1—Catalog 600-L-6 covers the company's 30-ton diesel locomotive crane. It contains illustrations of mechanical features and presents views of the crane in different types of work. Specifications are listed.

For More Details Circle No. 101—Page 209

FLEXIBLE SHAFTING: Elliott Mfg. Co., 350 State St., Binghamton, N. Y.—Catalog 49 describes, illustrates and lists specifications of company's range of products including flexible shafts, flexible shaft machines, unit drives, attachments and push-pull controls.

For More Details Circle No. 102—Page 209

MOTOR CONTROL: Trumbull Electric Mfg. Co., Plainville, Conn.—Bulletin TEB 8 on magnetic motor control presents complete product da-

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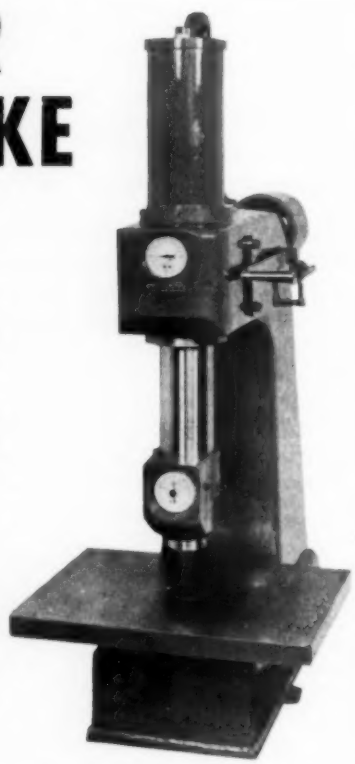

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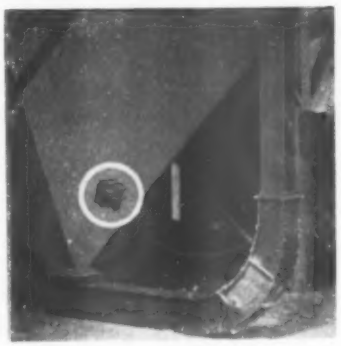

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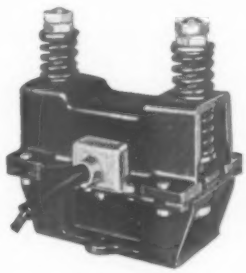

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LABORATORY EQUIPMENT: Buehler Ltd., 165 West Wacker Dr., Chicago 1—Two folders are offered: One describes surfacers and grinders for specimen preparation in the metallurgical laboratory, and the other describes cut-off machines for laboratory use.

For More Details Circle No. 104—Page 209

GAS WELDING: Air Reduction Sales Co.. 60 East 42nd St., New York 17—First in a projected series of ten catalogs describes 19 different gas welding rods, 8 different fluxes, and includes a section on silver brazing alloys plus a page devoted to carbon rods and carbon plates.

For More Details Circle No. 105—Page 209

CORROSION RESISTANCE: International Nickel Co., 67 Wall St., New York 5—Technical bulletin T-3 discusses the resistance of high-nickel alloys to corrosion by sulphuric acid. It covers the performance of over 30 different nickel-bearing materials in a wide range of services.

For More Details Circle No. 106—Page 209

SAND CONDITIONING: Beardsley & Piper Division of Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39—Illustrated bulletin describes the company's portable foundry sand conditioner and lists specifications of the three models.

For More Details Circle No. 107—Page 209

AIR FILTER: Dollinger Corp., 11 Centre Pk., Rochester 3, N. Y.—Illustrated bulletin describes the company's 4-stage self-cleaning air filter. Tables show capacities, dimensions and performance data of the various sizes.

For More Details Circle No. 108—Page 209

CODE CALL: Engineering & Mfg. Co., 154 West Fourteenth St., New York 11—Bulletin 4B-224 describes advantages, operating features, and illustrates components of the code call system with typical wiring diagrams.

For More Details Circle No. 109—Page 209

POTASSIUM CYANATE: American Cyanamid Co., 30 Rockefeller Plaza, New York 20—Bulletin describes physical and chemical properties of potassium cyanate. Among other applications it may be used in baths for treating metals.

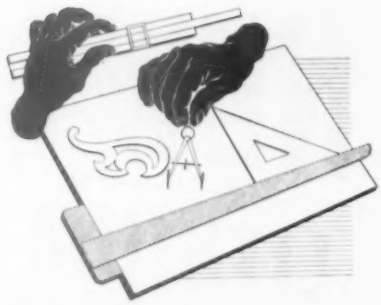
For More Details Circle No. 110—Page 209

AIR MOTORS: Bellows Co., 222 West Market St., Akron, O.—Bulletin BM20R shows the various types of air motors available and describes motor accessories. Typical applications are illustrated.

For More Details Circle No. 111—Page 209

CUPOLA DUST SUPPRESSOR: Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.—Bulletin FY-158 describes a cupola spark, fume, and dust suppressor.

For More Details Circle No. 112—Page 209



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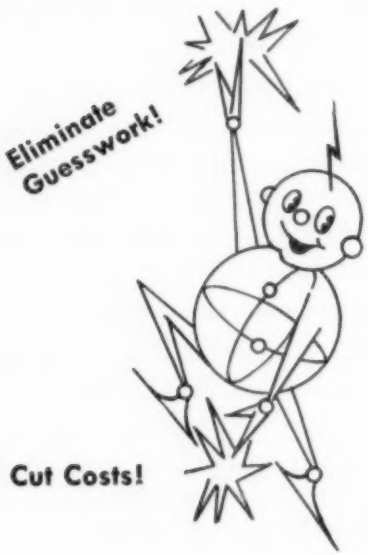

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FULL UTILIZATION KEY TO *Materials Handling Success*

(*Cantinued from page* 93)

been neglected because conditions are such that wheeled materials handling devices can not negotiate crowded floor areas. By use of the indicated types of pallets and skids plus the correct accessories, palletization without fork trucks is possible.

Generally speaking, introduction of palletization (a term which in essence includes not only pallets but also skids, skid boxes, and other containers) in a foundry is a low-cost means for increasing handling efficiency. However, in casting shops the use of pallets is complicated by the peculiar nature of the materials handling cycle. In the foundry the materials to be handled change from solid to liquid and then back to the solid state. This is of course not true of most other industries where raw, semi-processed, and finished materials are at all times amenable to handling by skid or pallet.

Break the Cycle

In many modern foundries the problem is solved by breaking the cycle of pallet handling at the beginning of the melting operation and resuming it after the molten metal is formed. Thus, skid bins, buckets, pallets, and skids, described earlier, are used in receiving, storage, and handling of materials. After the metal is cast, parts are then carried from one production step to the other on suitable containers. Whether at the blasting booths, the hand finishing benches, the inspection areas, the machine shop, or the heat treat room, castings are carried from one operation to the next on pallets. Parts are lifted from one pallet, processed, then replaced on a second pallet. In this manner, castings remain above ground throughout the entire fabrication cycle and in that manner are stored for final shipment. In finished stores, castings are stacked ceiling high in skids as shown in Figs. 11 and 12 or on pallets as shown in Fig. 13. In either event the castings are readily available for delivery to shipping as well as for inventory, inspection, and other purposes, as shown in Fig. 15.

Palletization enhances full utilization of materials handling equipment by combining on one easily handled carrier, materials which otherwise might have to be handled individually. By stacking one skid or pallet on top of the other, as is demonstrated in Fig. 14, materials handling devices are able to work close to their rated weight or handling capacities.

Selection among the many different varieties of skids and pallets is a matter in which individual plant conditions are the main guiding factor. Generally speaking, nature of foundry work dictates the use of metal, reinforced wood, or other types of durable pallets and skids capable of long service under rough handling conditions. A sampling of skid types intended for foundry use are included in Figs. 16 and 17.

The concept of full utilization of materials handling equipment is of special value today when foundries and industry as a whole are confronted by high production costs and increased resistance to prevailing prices. In such an increasingly competitive environment, materials handling must pay its own way not in terms of mechanization for its own sake but in terms of direct economies. Having provided for full utilization, the individual foundry can then seek additional economies through the judicious purchase of new equipment.

Sources of Illustrations

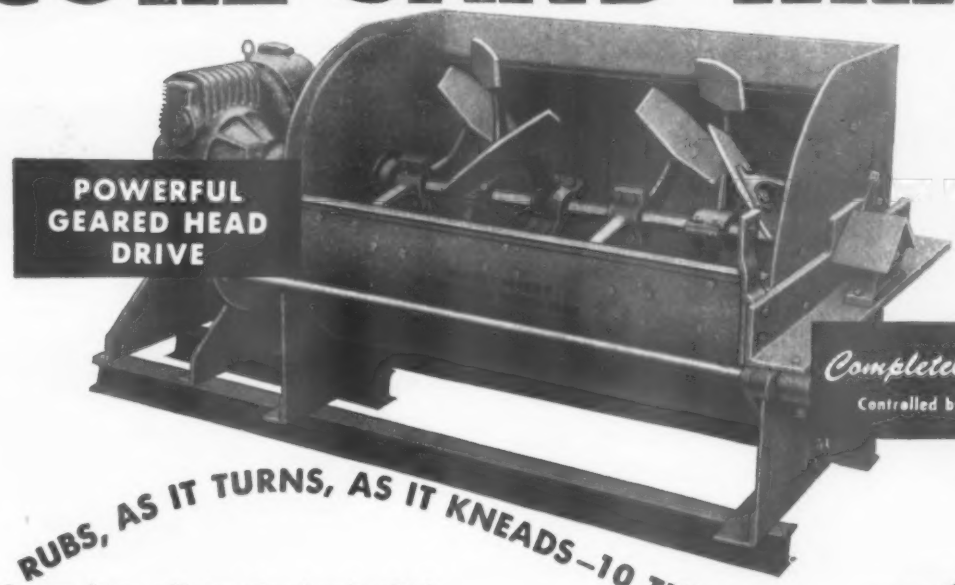
Figs. 1, 2, 4, 9, 12, 13, 15—Clark Tructractor Co.
Figs. 3, 14—Towmotor Corp.
Figs. 5, 11, 16, 17—Union Metal Mfg. Co.
Figs. 6, 7—Wright Aeronautical Corp.
Fig. 8—Westinghouse Electric Corp.
Fig. 10—Electric Truck Manufacturers Association.

Students Inspect Metals Plant

An opportunity to incorporate practical studies in their metallurgical engineering courses was afforded 41 students from the Case Institute of Technology, Cleveland, when they were taken on a tour of the Whiting, Ind., plant of Federated Metals Division, American Smelting & Refining Co. The visit on June 17 was another in a continuing series of plant visits sponsored by the Federated organization in co-operation with colleges and universities.

The inspection tour was conducted by J. F. McQuillan, plant superintendent, with Gerald M. Cover, assistant professor, and F. J. Miller, instructor, in charge of the students attending. Carl J. Gross is plant manager at the Whiting plant. Particular attention was given to alloying of various brass and bronze ingot metals, and to the many different types of furnaces at the plant. An explanation was given of the careful segregation and classification afforded the many nonferrous metals entering the plant as scrap. Inspection of solder, babbitt, type metal and lead alloy manufacture was seen, as was the controlled production of master alloys in electric furnaces and operation of by-product cupolas.

CORE SAND MIXERS



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Controlled by "Start" and "Stop" Buttons

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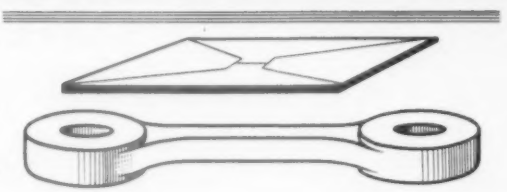

and there you have a method whereby you can increase your foundry production and improve your practice!

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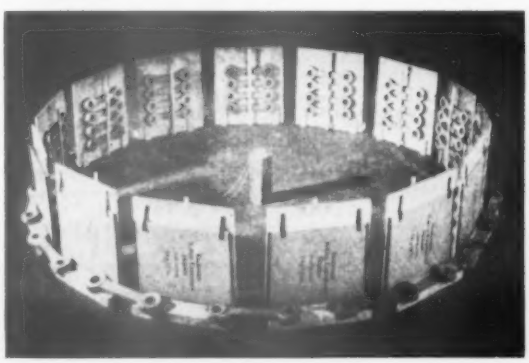
is new, compared with X-ray radiography, but its peculiar advantages have been finding increasing favor with steel foundries. The first commercial radiograph with radium was made in 1930—an exposure of the sternpost of the cruiser "Chester"—and by 1948 200 steel foundries throughout the country were using radium radiography. The equipment is absurdly simple, and, since it may be rented or leased, no capital expenditure is necessary. No special training is required to operate it, either. The constant activity of radium, the even dispersion of its rays with a minimum of scattering; the portability of the equipment and simplicity of operation all combine to make radium radiography a sound commercial proposition for manufacturers of steel castings. Write today for case histories and additional information.

Illustration shows 60 steel castings being photographed simultaneously. The gamma rays, flying in all directions, go through all the castings at once, making 60 exposures of the 60 castings.



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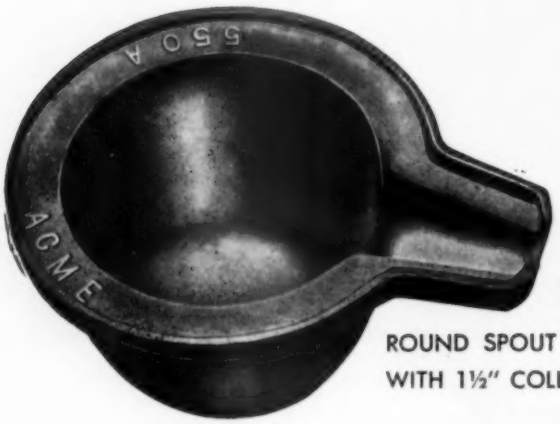

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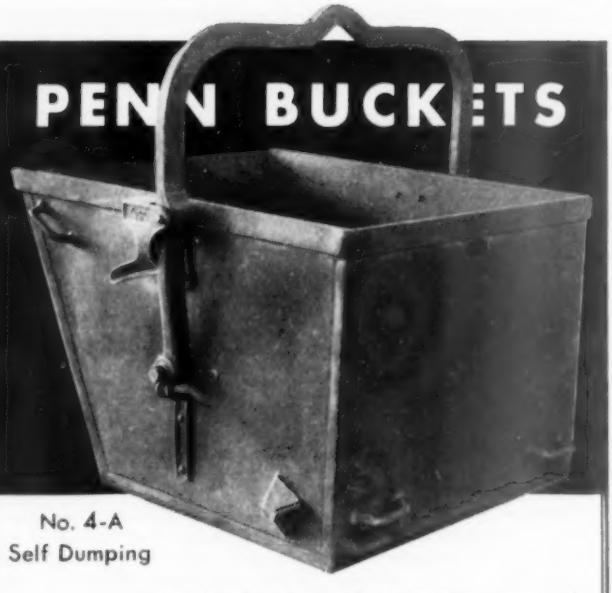

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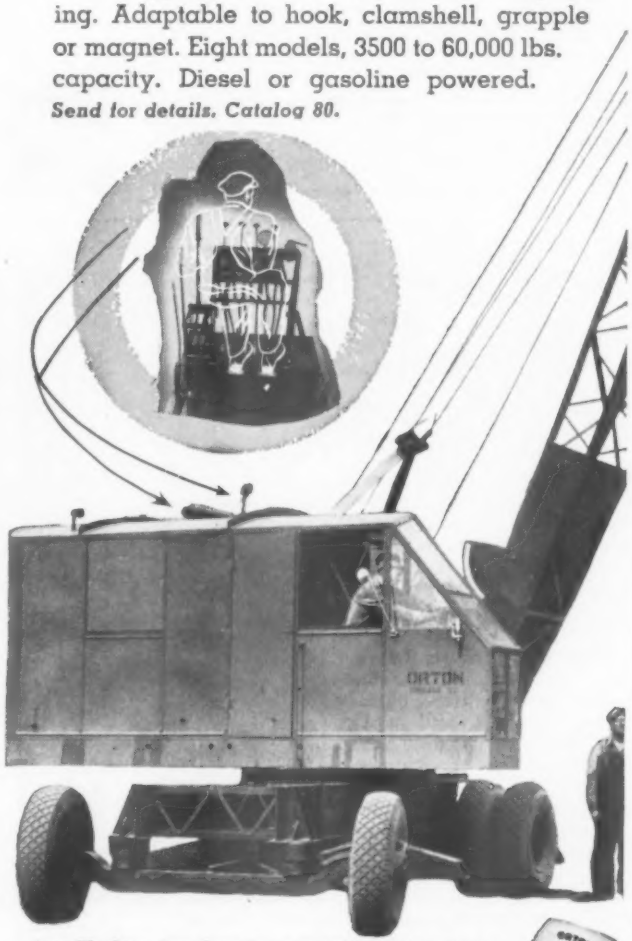

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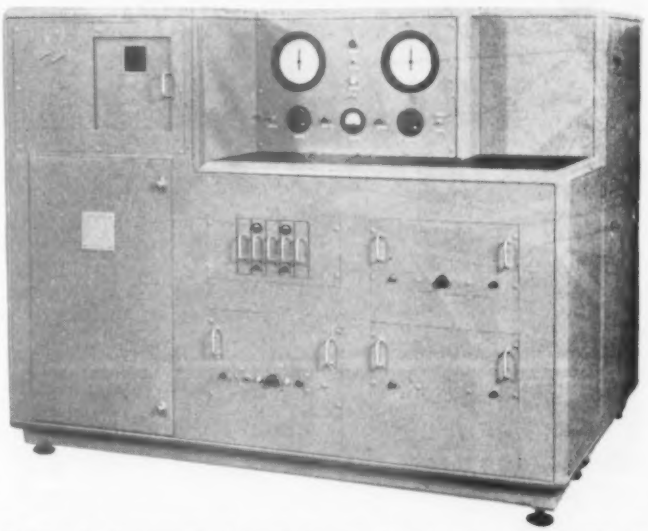

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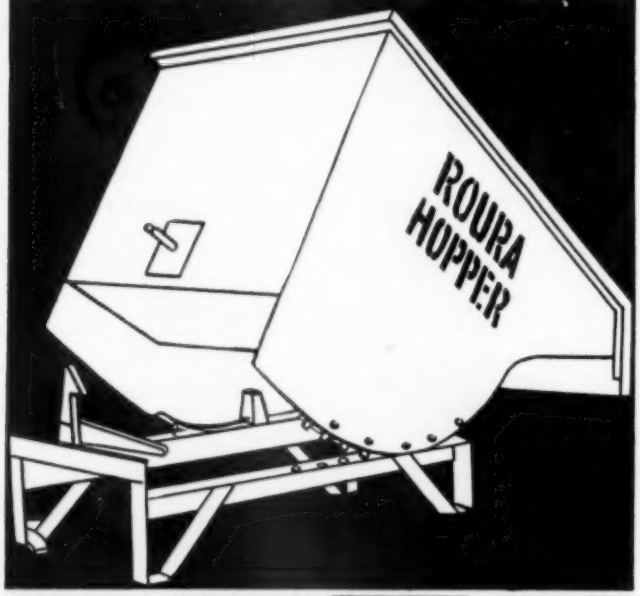

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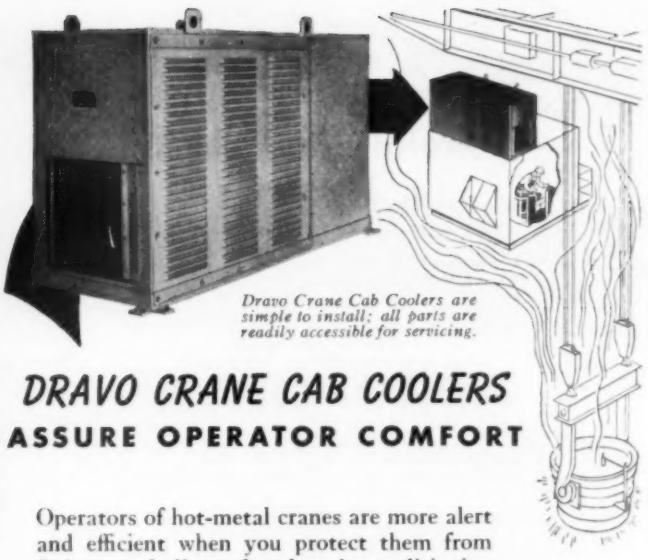

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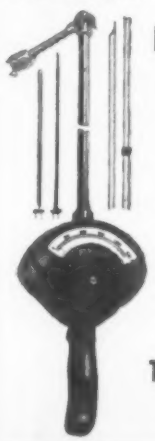

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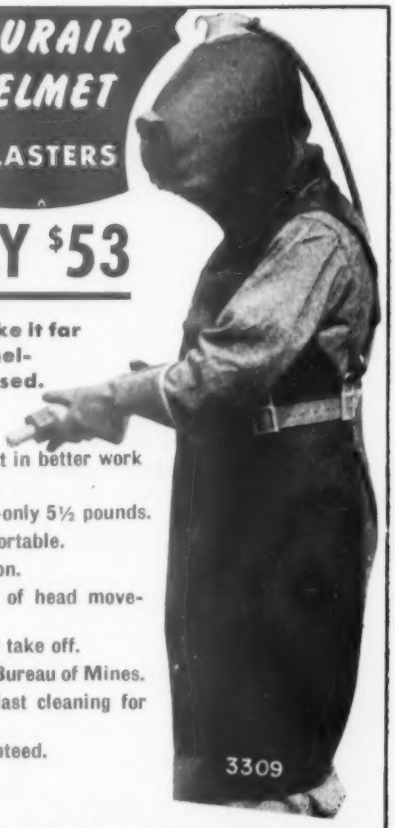

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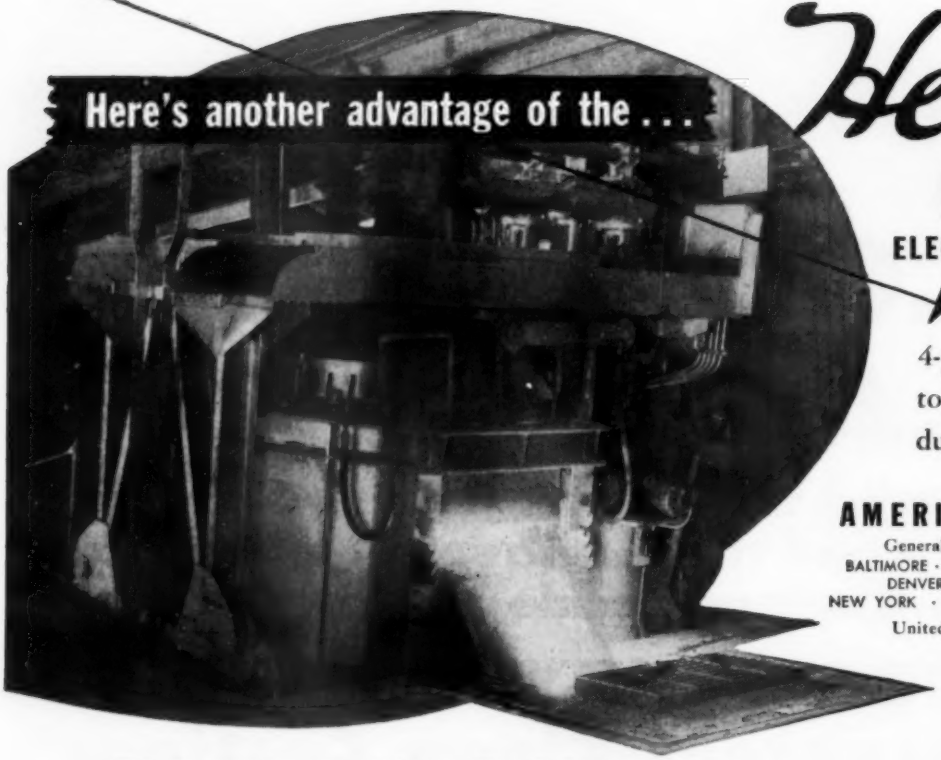

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With The PETERSON

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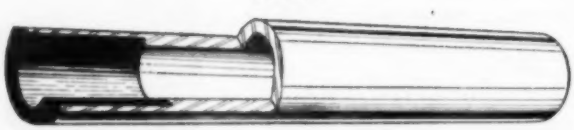
TRADE MARK REGISTERED

Here's a patented rubber bushing that offers the foundryman a host of advantages. The HOLINER bushing insures a seal between core box and blow plate on core machines. The HOLINER also ends blow plate abrasion without costly machining, makes plywood blowplates last like steel, makes it possible to blow through narrow ribs and small bosses, permits the salvaging of old plates and core boxes eroded beyond normal use and makes possible adjustment to meet an uneven or wedge shape core box.

THE PETERSON "SAND ARRESTER" TUBE



The "Sand Arrester" tube is used in core boxes mounted on blowing machines having the draw feature. Blow tube sand column will not draw out of "Sand Arrester" tube. Cope side of core is ready for drier without patching, brushing or blowing off.

Ask your Foundry Supply Dealer to show you the PETERSON HOLINER BUSHING or "SAND ARRESTER" TUBE, or write for complete details.

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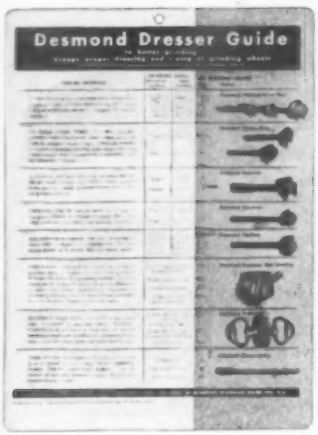

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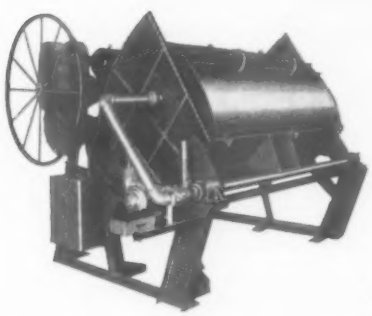

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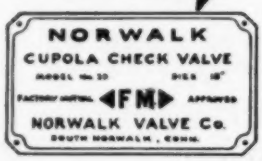


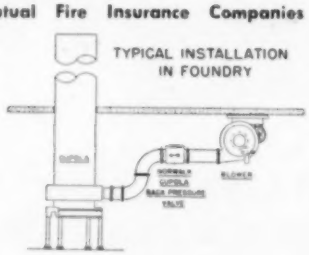
for cupola air lines

PREVENTS production interruptions because of blower damage; prevents back flow of combustible gases into piping blower and foundry itself.

A major factor in foundry explosions is failure of the human element. The man in charge of cupola operation forgets to close the blast gate in the air blast line to the cupola, following shutdown of blower during a melt. Combustible gases then find their way through the windbox air blast piping and blower into blower room and foundry, instead of upward through charge and out stack.

Associated Factory Mutual Fire Insurance Companies recommend the Norwalk Cupola Back Pressure Valve to guard against this potential explosion cause . . . failure in the human element.

Write for recommendations on guarding yourself against interrupted production this easy low cost way.



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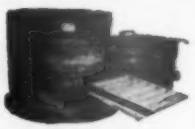
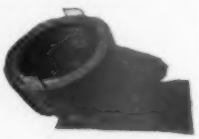
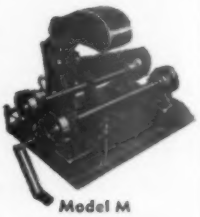

Model AS

These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.


Model J

They are made in a large variety of styles and a wide range of sizes. Complete technical information is supplied concerning sand and permanent mold design, gating, sand mixes, speeds, etc.

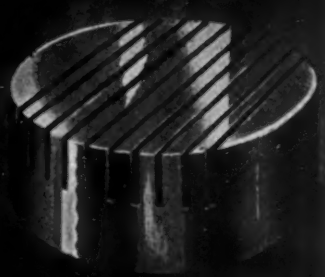

Model M

Send us drawings or sketches of parts you are interested in casting centrifugally, and we will tell you, without obligation, if and how our machines can cast them faster, cleaner and with fewer rejects.

Model J-P

CENTRIFUGAL CASTING MACHINE COMPANY
Nathan Janco, *President*
P. O. Box 947 **Tulsa 1, Okla.**

Precision



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Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock.

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Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

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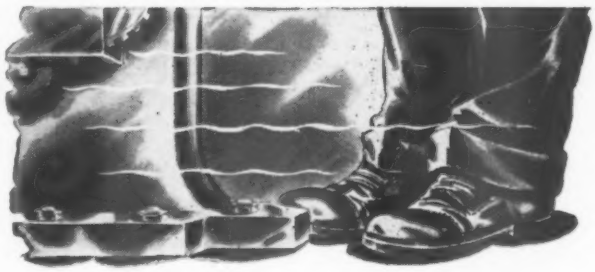

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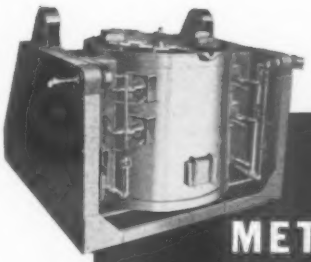

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	POT	1400°F.	TP	Melting Aluminum and Magnesium	TP-45
STATIONARY	CRUCIBLE	2500°F.	CR	Melting Brass and Copper	CR-45
		1400°F.	AC	Melting Aluminum	AC-45
	POT	1400°F.	AM	Melting Aluminum	AM-45
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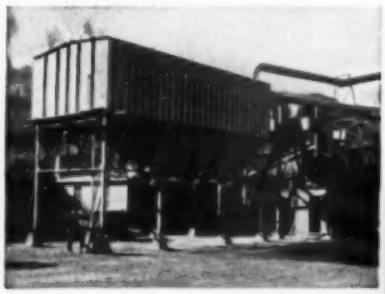

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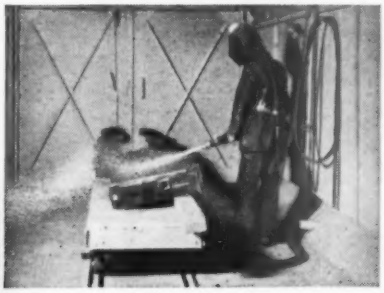

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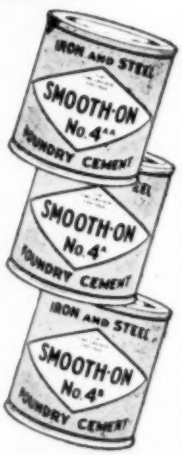

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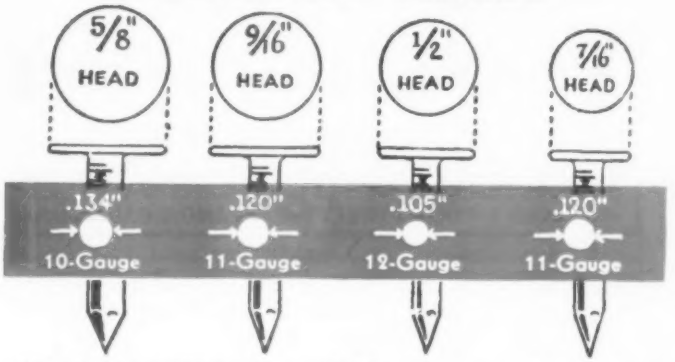

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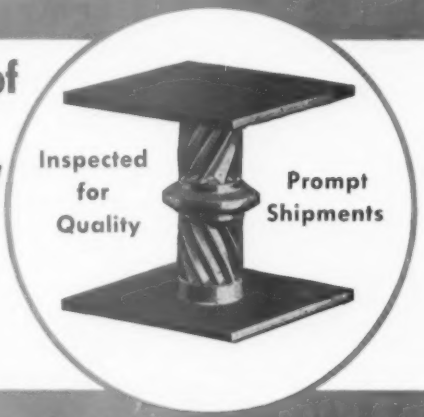

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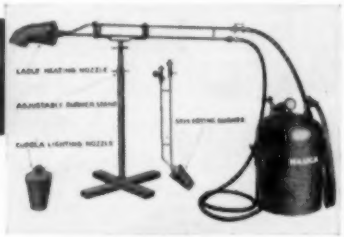

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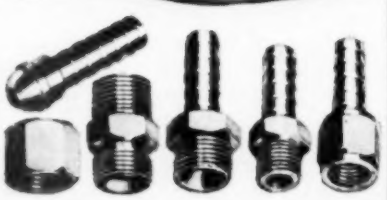

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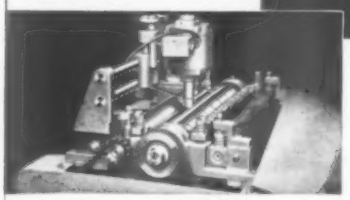

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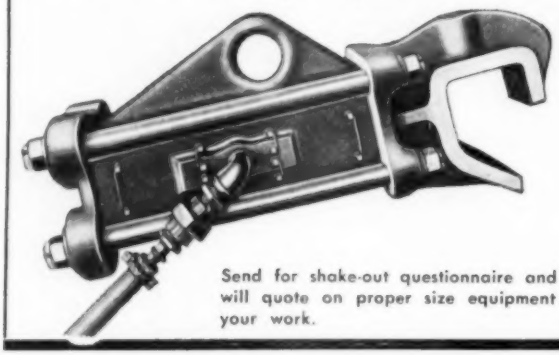

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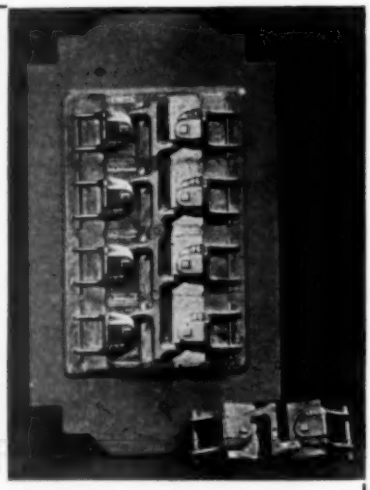

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Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
United Oil Mfg. Co., 1429 Walnut St., Erie, Pa.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE BLOWER BUSHINGS

Martin Engineering Co., Kewanee, Ill.

CORE BLOWING MACHINES

Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Wm. Demmler & Bros., Kewanee, Ill.
Federal Foundry Supply Co. 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Harrison Machine Co., 2725 Station Rd., Wesleyville, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
The Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

CORE BOXES

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Harrison Machine Co., 2725 Station Rd., Wesleyville, Pa.
Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
Plastic Corp. of Chicago, 2444 So. Central Ave., Cicero 50, Ill.

CORE COMPOUND

Bakelite Corp., 300 Madison Ave. New York 17, N. Y.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 16, Mich.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
Velsicol Corp., 330 E. Grand Ave., Chicago 11, Ill.

CORE CUTOFF & CONING MACHINES

Wadsworth Equipment Co., 2457 Mogadore Rd., Akron, Ohio.

CORE DRAWING MACHINES

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Newaygo Engineering Co., Newaygo, Mich.

CORE DRIERS (Dielectric)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.

CORE GRINDERS (Power Operated)

Jeffrey Mfg. Co., Columbus 16, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

CORE KNOCKOUT MACHINES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Pangborn Corp., Hagerstown, Md.
Simplicity Engineering Co., Durand, Mich.

CORE MAKING MACHINES

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Davenport Machine & Foundry Co., Davenport, Iowa.

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Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England
Harrison Machine Co., 2725 Station Rd., Wesleyville, Pa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3228 W. Pierce St., Milwaukee 4, Wis.
Redford Iron & Equipment Co., 20733 Glendale Ave., Detroit 23, Mich.
The Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Wadsworth Equipment Co. 2457 Mogadore Rd., Akron, Ohio

CORE OILS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Cities Service Oil Co., 3200 S. Western Ave., Chicago 8, Ill.
Dayton Oil Co., Dayton 1, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Fordath Engineering Co. Ltd., West Bromwich, Birmingham, England
Foundry Service Co., Birmingham, Ala.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.
Werner G. Smith Co., 2191 W. 110th St., Cleveland 2, O.
Frederic B. Stevens, Inc., Detroit 26, Mich.
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Delta Oil Products Co., Milwaukee 9, Wis.
Eastern Clay Products Co., Jackson, O.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
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Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
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Wadsworth Equipment Co. 2457 Mogadore Rd., Akron, Ohio

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Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
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Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

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Clark Industrial Truck Div. of Clark Equipment Co., Battle Creek, Mich.
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Federal Foundry Supply Co. 4600 E. 71st St., Cleveland 5, O.
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Stevens, Frederic B., Inc., Detroit 26, Mich.
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Shanafelt Mfg. Co., 3623 Winfield Way, N. E., Canton 5, Ohio
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.
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Fremont Flask Co., Fremont, O.
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METALLURGISTS

Crobaugh Co., Frank L., 1426 West Third St., Cleveland 13, Ohio.

METERS (Gas, Air, Water)

Roots-Connersville Blower Corp., Connersville, Ind.

MICROPHOTOMETERS

Baird Associates, 33 University Rd., Cambridge 38, Mass.

MIXERS (Core Wash)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Multiplex Machinery Corp., Elmore, Ohio

MIXERS (Sand and Clay)

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington St., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Co., Waterloo, Iowa.
Fordath Enginering Co. Ltd., West Bromwich, Birmingham, England.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Multiplex Machinery Corp., Elmore, Ohio
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Royer Foundry & Machine Co., Kingston, Pa.
Sather Mfg. Co., Everett, Wash.

MODELS (Wood)

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

MOLD BOARDS

Parkwood Corp., Wakefield, Mass.

MOLD CONVEYORS

Bartlett & Snow, C. O., Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

MOLD CONVEYORS (Cont'd)

Logan Co., 580 Cabel, Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.

MOLD DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

MOLD OVENS and DRYERS

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, O.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.

MOLD TRUCKS (Power Operated)

Clark Industrial Truck Div. of Clark Equipment Co., Battle Creek, Mich.

MOLD WASH

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.
United States Graphite Co., Saginaw, Mich.

MOLDERS BENCHES

Western Tool & Mfg. Co., Springfield, Ohio.

MOLDING MACHINES

Adams Co., Dubuque, Iowa.
Arcade Manufacturing Div., Rockwell Mfg. Co., Freeport, Ill.
Beardsley & Piper Co., The 2424 N. Cicero, Chicago 39, Ill.
British Moulding Machine, Faverham, Kent, England
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport, Machine & Foundry Co., Davenport, Iowa.
Foundry Service Co., Birmingham, Ala.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nichols, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Jolt)

Adams Co., Dubuque, Iowa.
Arcade Manufacturing Div., Rockwell Mfg. Co., Freeport, Ill.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINE MOUNTING PADS

Fabreeka Products, Inc., 222B Summer St., Boston, Mass.

MOLDING MACHINE (Repairing)

Standard Pattern Works, 13781 Concord, Detroit 12, Mich.

MOLDING MACHINES (Rollover)

Arcade Manufacturing Div., Rockwell Mfg. Co., Freeport, Ill.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING MACHINES (Squeeze)

Adams Co., Dubuque, Iowa.
Arcade Manufacturing Div., Rockwell Mfg. Co., Freeport, Ill.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Davenport Machine & Foundry Co., Davenport, Iowa
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
International Molding Machine Co., LaGrange Park, Ill.
Johnston & Jennings Co., 867 Addison Rd., Cleveland 14, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Moline Iron Works, Moline, Ill.
Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

MOLDING SANDS

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

MOLYBDENUM

Molybdenum Corporation of America, Pittsburgh 19, Pa.

MONORAIL SYSTEMS

American Monorail Co., 13104 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., 1155 East 283rd St., Wickliffe, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ohio Electric Mfg. Co., 5906 Maurice Ave., Cleveland, Ohio.

MOUNTING PADS, MOLDING AND SHAKEOUT MACHINES

Fabreeka Products, Inc., 222B Summer St., Boston, Mass.

NAILS (Chill)

Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland 5, O.
Republic Steel Corp, 3100 E. 45th St., Cleveland 4, Ohio.
Standard Horse Nail Corp., New Brighton, Pa.

NICKEL

International Nickel Co., Inc., 67 Wall St., New York City 5.

NITROGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.

NOZZLES (Blasting)

Alloy Metal Abrasives Co., 311 W. Huron St., Ann Arbor, Mich.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 7st St., Cleveland 5, O.
Norton Co., Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
W. W. Sly, Mfg. Co., 4753 Train Ave., Cleveland 2, O.

OIL BURNERS

Hauck Manufacturing Co., 106 Tenth St., Brooklyn 15, N. Y.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Stroman Furnace & Engineering Co., Div. of Peterson Oven Co., 9900 Franklin Ave., Franklin Park, Ill.

OVENS (Annealing and Heat Treating)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, Ohio.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Company, 750 Prospect Ave., Cleveland 15, O.
Lindberg Engineering Co., Fisher Furnaces Div., 2450 West Hubbard, Chicago 12, Ill.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

OVENS (Core) (See CORE OVENS)

OVENS (Enameling, Japanning)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.

OVENS (Mold)

Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Lanly Co., 750 Prospect Ave., Cleveland 15, Ohio.

OXYGEN

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

PAINT (Rust Proof)

Speco Inc., 7308 Associate Ave., Cleveland, Ohio.

PARTING COMPOUNDS

Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Smith Oil & Refining Co., 1102 Kilburn Ave., Rockford, Ill.

PARTING COMPOUNDS (Cont'd.)

Frederic B. Stevens, Inc., Detroit 16, Mich.
E. F. Houghton Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.
Thiem Products Co., 9800 West Rogers, Milwaukee 14, Wis.

PATTERN ADHESIVES

National Starch Products Inc., 270 Madison Ave., New York 16, N.Y.

PATTERN BOARD STOCK

Parkwood Corp., Wakefield, Mass.

PATTERN COATINGS

American Lacquer Solvents Co., Phoenixville, Pa.

PATTERN COMPOUND

Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

PATTERN LETTERS

Freeman Supply Co., Toledo 5, O.

PATTERN LUMBER

Dougherty Lumber Co., Cleveland 5, O.
Freeman Supply Co., Toledo 5, O.
Rietz Lumber Co., 1800 N. Central Park Ave., Chicago, Ill.

PATTERN MATERIAL (Plastic)

G. G. Schroeder & Co., 1416 South Penn Square, Philadelphia 2, Pa.

PATTERN PLATES

Accurate Match Plate Co., 1847 W. Caroll St., Chicago, Ill.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Central Pattern Co., Quincy, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Foundry Service Co., Birmingham, Ala.
Freeman Supply Co., Toledo 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Plaster Process Castings Co., 6922 Carnegie Ave., Cleveland 3.
Scientific Cast Products Corp., 1388-92 E. 40th St., Cleveland 3, O.

PATTERN PLATE STOCK

Freeman Supply Co., 1152 Broadway, Toledo 5, O.

PATTERN SHOP EQUIPMENT

Buss Machine Works, 201 West 8th St., Holland, Mich.
DoAll Company, Des Plaines, Ill.
Freeman Supply Co., 1152 East Broadway, Toledo 5, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.
Skilsaw, Inc., 5000 N. Elston, Chicago 30, Ill.

PATTERN SUPPLY HOUSES

Freeman Suppy Co., 1152 East Broadway, Toledo 5, Ohio.

PATTERNS

Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.

PATTERNS (PLASTIC)

Central Pattern Co., Quincy, Ill.
Plastic Corp. of Chicago, 2444 So. Central Ave., Cicero 50, Ill.

PATTERNS (Wood, Metal)

Accurate Match Plate Co., 1847 W. Carroll St., Chicago, Ill.
Buffalo Pattern Works, 830 Hertel Ave., Buffalo, N. Y.
Central Pattern Co., Quincy, Ill.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
City Pattern Foundry & Machine Co., 1161 Harper Ave., Detroit 11, Mich.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
S. P. O. Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Wellman Bronze & Aluminum Co., 2525 E. 93rd St., Cleveland 4, O.

PERMANENT MOLD COATINGS

Acheson Colloids Corp., Port Huron, Mich.

PERMANENT MOLDS

Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.
Rossborough Supply Co., 1456 W. 9th St., Cleveland 13, O.

PHOTOGRAPHIC EQUIPMENT

Eastman Kodak Co., Rochester, N. Y.

PHOTOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.

PIG IRON

Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, Ohio.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Hickman-Williams & Co., Union Commerce Bldg., Cleveland 14, O.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Pickands, Mather & Co., Cleveland 14, O.
Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio.
Tennessee Products & Chemical Corp., American National Bank Bldg., Nashville 3, Tenn.
Woodward Iron Co., Woodward, Ala.

PIG IRON (Silvery)

Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.

PINS (Flask)

Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Shanafelt Mfg. Co., 3623 Winfield Way, N.E., Canton 5, Ohio.
Sterling Wheelbarow Co., 7100 W. Walker St., Milwaukee 14, Wis.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.
Universal Engineering Co., Franknenmuth, Mich.

PISTON RINGS (for Molding Machines, Compressors, etc.)

Nicholls, Wm. H., Co., Richmond Hill, Long Island 18, N. Y.

PLANT ENGINEERING SERVICE

Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.

PLANT ENGINEERING SERVICE (Cont'd.)

Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.

PLATES (Bottom)

Adams Co., Dubuque, Iowa.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

PLATES (Core Drying)

Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Johns-Manville, 22 East 40th St., New York City 16.

PLATING TEMPERATURE CONTROLS

Foxboro Company, Foxboro, Mass.

PLUMBAGO

Bloomsbury Graphite Co., Bloomsbury, N. J.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Service Co., Birmingham, Ala.
Frederic B. Stevens, Inc., Detroit 16, Mich.
United States Graphite Co., Saginaw, Mich.

PNEUMATIC TOOLS

Chicago Pneumatic Tool Co., 6 East 44th St., New York 17, N. Y.
Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Gardner-Denver Co., Quincy, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
Master Pneumatic Tool Co., Inc., Orwell, Ohio.
Rotor Tool Co., 17325 Euclid Ave., Cleveland 12, Ohio.
Schramm Inc., West Chester, Pa.

POURING DEVICES

Modern Equipment Co., Port Washington, Wis.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

PRESSER BOARDS

Adams Co., Dubuque, Iowa.
Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.

PRESSES (Hydraulic)

Hydraulic Press Mfg. Co., Mount Gilead, Ohio.

PRESSURE CASTING SEALER

Empire Varnish Co., 2636 E. 76th St., Cleveland 4, O.

PRESSURE RECORDERS

Foxboro Company, Foxboro, Mass.

PULLEYS (Magnetic)

Dings Magnetic Separator Co., 4740 Electric Ave., Milwaukee 7, Wis.
Stearns Magnetic Mfg. Co., 662 S. 28th St., Milwaukee 4, Wis.

PUMPS

Construction Machinery Co., Waterloo, Iowa.
Gardner-Denver Co., Quincy, Ill.

PUMPS (Dry, Vacuum)

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.
Fuller Company, Catasauqua, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.

PURIFIERS

Cleveland Flux Co., 1026 Main St., Cleveland 13, O.

PUSH-OFF MACHINES

Beardsley & Piper Co., 2424 N. Cicero, Chicago 39, Ill.
Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
International Molding Machine Co., LaGrange Park, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

PUTTY (Foundry)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

PYROMETERS

Brown Instrument Co. Div. Minneapolis-Honeywell Regulator Co., 4462 Wayne Ave., Philadelphia 44, Pa.
Foxboro Company, Foxboro, Mass.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
Marshall Co., L. H., 270 W. Lane, Columbus 1, O.
Pyrometer Instrument Co., Bergenfield, N. J.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

PYROMETERS (Immersion)

Pyrometer Instrument Co., Bergenfield, N. J.

PYROMETERS (Optical)

Pyrometer Instrument Co., Bergenfield, N. J.

RACKS (Core Oven)

Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

RADIOGRAPHY (Industrial)

Eastman Kodak Co., Rochester, N. Y.
Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.

RADIUM

Radium Chemical Co., Inc., 570 Lexington Ave., New York 22, N. Y.

RAMMERS

Independent Pneumatic Tool Co., Aurora, Ill.

REFRACTORIES

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Carborundum Co., Niagara Falls, N. Y.
Carborundum Co., Perth Amboy, N. J.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.
Eastern Clay Products, Inc. Jackson, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.

REFRACTORIES (Cont'd.)

A. P. Green Fire Brick Co., Mexico, Missouri
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
Ironton Fire Brick Co., Ironton, O.
Lindberg Engineering Co., Fisher Furnace Div., 2450 West Hubbard, Chicago 12, Ill.
Norton Co., Worcester 6, Mass.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Robinson Clay Product Co., 1100 Second National Bldg., Akron, Ohio
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.
Chas. Taylor Sons Co., P.O. Box 58, Annex Sta., Cincinnati 14, Ohio
United States Graphite Co., Saginaw, Mich.

RESPIRATORS

Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
B. F. McDonald Co., 1248 South Hope St., Los Angeles 15, Calif.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Wilson Products Inc., Reading, Pa.

RIDDLES

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Frederic B. Stevens, Inc., 18th St. & Vernor Highway, Detroit 16, Mich.

RIDDLES (Electric)

Champion Foundry & Machine Co., 1553 West Madison St., Chicago 7, Ill.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Great Western Mfg. Co., Leavenworth, Kans.
Roller Riddle Corp., P.O. Box 178, Port Huron, Mich.

RIDDLES (Hand)

Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

ROD DIP

Smith Oil & Refining Co., 7102 Kilburn Ave., Rockford, Ill.

ROD STRAIGHTENERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.

RODS (Steel)

Republic Steel Corp., 3100 E. 45th St., Cleveland 4, Ohio

ROLLER-HEARTH FURNACES (Electric Annealing)

General Electric Co., Schenectady, N Y.

RUBBER LINING MATERIAL (Abrasive Resisting)

Pangborn Corp., Hagerstown, Md.

RUST PROOF PAINT

Speco Inc., 7308 Associate Ave., Cleveland, Ohio

SAFETY CLOTHING

American Optical Co., Southbridge, Mass.
Chicago Eye Shield Co., 2300 West Warren, Chicago 12, Ill.
B. F. McDonald Co., 1248 South Hope St., Los Angeles 15, Calif.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.

SALT and SALT TABLETS

B. F. McDonald Co., 1248 South Hope St., Los Angeles 15, Calif.
Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.

SAND ARRESTER TUBES

Martin Engineering Co., Kewanee, Ill.

SAND (Core, Molding, Blasting)

American Silica Sand Co., Ottawa, Ill.
Carpenter Brothers, Inc., 606 West Wisconsin, Milwaukee 3, Wis.

SAND (Core, Molding, Blasting) (Cont'd.)

Great Lakes Foundry Sand Co., United Artists Bldg., Detroit 26, Mich.
Pangborn Corp., Hagerstown, Md.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Producers Core Sand Corp., Michigan City, Ind.
Standard Silica Corp., 209 So. LaSalle St., Chicago 4, Ill.
Wedron Silica Co., 38 So. Dearborn St., Chicago, Ill.

SAND BLAST BARRELS

American Wheelabrator & Equipment Co., 505 S. Brykit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W. 4753 Train Ave., Cleveland 2, O.

SAND BLAST CABINETS

American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.

SAND BLAST EQUIPMENT

American Air Filter Co., 266 Central Ave., Louisville 8, Ky.
American Wheelabrator & Equipment Co., 505 S. Byrkit St., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST NOZZLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Norton Company, Worcester 6, Mass.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST ROOMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Hydro-Blast Corp., 2550 N. Western Ave., Chicago 47, Ill.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W. 4753 Train Ave., Cleveland 2, O.

SAND BLAST TABLES

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Pangborn Corp., Hagerstown, Md.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.

SAND BLAST CONDITIONERS

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.

SAND CONDITIONING (Chemical)

Johnson March Corp., 1724 Chestnut St., Philadelphia, Pa.

SAND CONTROL & TESTING EQUIPMENT

Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Harry W. Dietert Co., 9330A Roselawn Ave., Detroit 4, Mich.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND CONVEYING and HANDLING EQUIPMENT

American Air Filter Co., Louisville 8, Ky.
Ajax Flexible Coupling Co., Westfield, N. Y.
C. O. Bartlett & Snow Co., 6201 Harvard Ave., Cleveland 5, O.
Beardsley & Piper Co., The, 2424 No. Cicero, Chicago 39, Ill.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Clearfield Machine Co., Clearfield, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Cont'd)

Cleveland Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio
Frank G. Hough Co., Libertyville, Ill.
Jeffrey Mfg. Co., 907-99 N. Fourth St., Columbus 16, O.
Joy Mfg. Co., Joy Division, Pittsburgh, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Penn Iron Works, Reading, Pa.
Royer Foundry & Machine Co., Kingston, Pa.

SAND CONVEYING and HANDLING EQUIPMENT (Pneumatic)

Clark Industrial Truck Div. of Clark Equipment Co., Battle Creek, Mich.
Fuller Company, Catasauqua, Pa.
Robins Conveyors Div., Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.

SAND COOLING SYSTEMS

Newaygo Engineering Co., Newaygo, Mich.

SAND DRYERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, Ohio.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Nichols Engineering & Research Corp., 60 Wall Tower, New York 5, N. Y.

SANDERS (Pneumatic)

Cleco Division of Reed Roller Bit Co., Houston, Texas.

SANDERS (Tapered-Spindles)

Wellman Products Co., 1444 E. 49th St., Cleveland 3, O.

SANDING MACHINERY (Disc, Spindle, Belt, etc.)

Freeman Supply Co., 1152 E. Broadway, Toledo 5, Ohio.
Oliver Machinery Company, Grand Rapids 2, Mich.

SAND MEASURING and WEIGHING DEVICES

Baker Perkins Inc., Saginaw, Mich.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.

SAND MIXERS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Baker Perkins Inc., Saginaw, Mich.
Beardsley & Piper Co., The, 2424 N. Cicero, Chicago 39, Ill.
Blystone Division, Standard Sand & Machine Co., 549 W. Washington Blvd., Chicago 6, Ill.
Clearfield Machine Co., Clearfield, Pa.
Construction Machinery Corp., Waterloo, Iowa.
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Apex Core Oil sales distributors with proven sales record to the foundries. Open territories in Milwaukee, St. Louis, Toledo and Birmingham areas. Excellent opportunities.

APEX MOTOR FUEL COMPANY
INDUSTRIAL DIVISION
1401 W. NORTH AVENUE
CHICAGO 22, ILLINOIS

MANUFACTURERS' AGENTS

Sales representatives to sell core oils in Michigan and Alabama. Address: Box 556, The FOUNDRY, Cleveland 13, Ohio.

Accounts Wanted

ACCOUNTS WANTED

NEW ENGLAND FOUNDRY EXECUTIVE DESIRES TO BUILD UP MANUFACTURER'S AGENCY. CAN EFFICIENTLY HANDLE LINE OF FOUNDRY SUPPLIES AND EQUIPMENT. EXTENSIVE TECHNICAL AND PRACTICAL FOUNDRY EXPERIENCE. HAVE WIDE ACQUAINTANCE AND KNOWLEDGE WITH THE TRADE. ADDRESS: BOX 583, THE FOUNDRY, CLEVELAND 13, OHIO.

Engineering Service

HERBERT F. MILLER

CONSULTANT IN FOUNDRY OPERATIONS

AND ENGINEERING

1808 HANCOCK ST.
ROCKFORD, ILLINOIS

GRAY IRON, MALLEABLE IRON & STEEL

Pattern Work Wanted

Modern pattern shop, Cleveland area. Can take wood and metal first class work. Let us quote from your prints. Address: Box 516, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

NONFERROUS FOUNDRY
SUPERINTENDENT

40 years' practical experience on production and jobbing in bronze, aluminum and nickel bronze. Seeking a change. Will go anywhere. Address: Box 599, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

34, degree, practical experience in grey iron mixtures, farm implements, automotive, machine tools and pressure castings, cupola operation, fuel substitution, natural and synthetic sands and facings, floor work and mechanized molding and sand handling systems. Address: Box 469, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Invites confidential correspondence with owner of established medium-size business requiring mature, dependable directing experience in management, sales, finance and production. Ability to carry complete responsibility and produce consistent sales and production costs and net results assured by previous record. Excellent experience iron and brass foundries, machine and related lines. Address: Box 538, The FOUNDRY, Cleveland 13, Ohio.

COREROOM SUPERINTENDENT

Experienced in gray iron, malleable, aluminum permanent molds, production, jobbing, sand mixing, blowing machines, sandslingers and all other core room equipment. Also patternshop experience. Address: Box 598, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON SUPERINTENDENT
OR
MANAGER

Very reliable man who can furnish excellent references. Twenty-seven years' experience in production and jobbing work and able to do a successful job for you. Address: Box 594, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Fifteen years' experience involving cupolas and electric furnaces. Any kind of iron made to close specifications. Versed in chemical and physical testing and sand control. Best references. Address: Box 557, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT—MANAGER

Gray iron foundryman, college education with 28 years' broad experience producing quality castings in the automotive field. Thoroughly experienced in all phases of foundry work, both jobbing and production. Have worked as an executive for the past 22 years in both gray iron and magnesium. Would like a connection with an old reliable firm in need of a cost minded foundryman. Can furnish the best of references for both ability and character. Address: Box 589, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

First class mechanic, also trouble shooter in foundry. Thirty years' experience in patterns, wood and metal and foundry work. Address: Box 515, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

PRACTICAL FOUNDRYMAN

Ferrous and nonferrous with both practical and technical training. A-1 metal man up-to-date on light and heavy castings. Capable of taking complete charge. Available for temporary or permanent engagements. Address: Box 601, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-two years in machine tool foundries and others requiring cast iron of similar high quality. Superintendent and assistant for five years. Age 39. Now employed. Address: Box 442, The FOUNDRY, Cleveland 13, Ohio.

CHIEF INSPECTOR

Sixteen years' experience in foundry pattern-making and machine shop in large foundry. Foundry foreman five years. Casting buyer for large heavy machinery manufacturer. Know foundry and machine shop problems. Thorough experience and past responsibility-know good castings and how to produce them. Age 38. Married. Trade school. ICS foundry practice. Temperate in all respects. Good references. No transient. Interested in permanency. Believe I know my business. That however is for you to decide after a trial period. Address: Box 586, The FOUNDRY.

SUPERINTENDENT
OR
GENERAL FOREMAN

Forty years' practical experience, light, medium and heavy work, production or jobbing. Plenty of machine experience including sand slinger. Am a man of proven ability. Salary to be left open until I show you. Address: Box 547, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

Wood and metal patternmaker first class. 30 years' experience in job shop and foundry trouble shooter. Experienced in layout work, can check, estimate and make patterns. Interested in small shop or supervise large shop. Address: Box 603, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

Specialize in technical control of irons and sands. Knows cupola operation, melting practices and foundry sands. Foreman and supervision experience. 27 years old, college graduate, five years' experience. Excellent recommendations as to ability and character. Desire responsible permanent position with future. Production and cost conscious. Address: Box 554, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY EXECUTIVE

AVAILABLE FOR PERMANENT OR REORGANIZATION ASSIGNMENT. FAMILIAR WITH THE TECHNICAL PRODUCTION OF SMALL AND LARGE JOBBING WORK AND ALL PHASES OF MANAGEMENT. LOCATION—NORTH EAST. ADDRESS: BOX 582, THE FOUNDRY, CLEVELAND 13, OHIO.

WORKS MANAGER

Manager of industrial relations. Thoroughly familiar with all production processes in manufacture of carbon, medium and high alloy castings. Have successfully supervised purchasing, stores, production control, production engineering, plant engineering, metallurgy, inspection, time study and incentive plans, cost estimating, cost accounting, labor relations and contract negotiations with unions. University graduate. Address: Box 534, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY SUPERINTENDENT

Twenty-eight years' experience as foundry superintendent. Practical molder. Understand cupola thoroughly. Prefer position with foundry making high grade castings. At present employed. Address: Box 571, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Age 37, experienced in production and jobbing machine tool, pump, engine and miscellaneous castings. Familiar with process iron and modern alloying technique. Good sand control, excellent labor relations. Some experience with nonferrous alloys. My scrap past two years has been 2.2%. Address: Box 552, The FOUNDRY, Cleveland 13, Ohio.

METALLURGICAL ENGINEER

Fifteen years' experience in iron and steel castings, rolls, manganese, Alnico and other special alloy castings. Foundry management, quality control, specifications. Qualified metallurgist, superintend foundry, head research, technical sales, technically assist executive. Address: Box 567, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRY INDUSTRIAL ENGINEER

Twenty years' experience in malleable, steel, grey iron and aluminum. Desires connection with reliable concern who wants to install standards and methods, production and cost control. For the past ten years supervisor of the Standards & Methods Department. Address: Box 600, The FOUNDRY, Cleveland 13, Ohio.

WORKS MANAGER
OR
FOUNDRY SUPERINTENDENT

Thoroughly capable and of proven ability to reduce costs, reduce scrap percentage and to better quality of castings. Good handler of labor relations. Ferrous metals. Address: Box 595, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Opportunities

WANTED—FLUX FORMULAS

For treatment of ferrous and nonferrous metals. Must be foundry proven formulas showing definite advantages in their uses.

BOX 604
The FOUNDRY CLEVELAND 13, OHIO

OPPORTUNITY

We have a foundry and machine shop equipped for smaller type work in quantities. We are looking for a small or medium type machine to manufacture, engineer and sell. Address: Box 551, The FOUNDRY, Cleveland 13, Ohio.

Opportunities

OPPORTUNITY

We can furnish at any point slack, fibre and tight barrels; also fibre and steel drums. Address: BUCKEYE COOPERAGE COMPANY, 3807 ORANGE AVENUE, CLEVELAND 15, OHIO.

PATTERNSHOP

Thirty years in the same location. This pattern shop is well equipped and ideally located in a low rental business district of Boston. A gem of an opportunity for one or two good men. Will turn over with work on hand. Price $7500 complete for immediate action. Owner unable to devote full time to operation.

BOX 565
The FOUNDRY CLEVELAND 13, OHIO

Employment Service

SALARIED POSITIONS
$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (39 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

FOR RENT

Nonferrous foundry, fully equipped for four moulders. Low rent. Address: EAST FOUNDRY, BOX 395, ROCHESTER, NEW YORK.

Foundries For Sale

FOUNDRY FOR SALE

Corporation desires to sell its gray iron production foundry near Kansas City. Good scrap market and utilities extremely low. Two railroad sidings. Capacity 10 to 15 tons daily. 30,000 sq. ft. floor space, pouring room 300 ft. long with overhead conveyors. Modern core room. Plant well equipped. Location presents many advantages for low cost production with ideal labor situation. Can be used for general manufacturing. Reasonably priced. Address: Box 602, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE OR LEASE

Complete foundry—or will sell equipment and buildings separately. Located Logansport, Indiana, 30,000 population, only foundry in town. Address: Post Office Box 710, Muncie, Indiana—phone 5539.

FOUNDRY FOR SALE

Going business, approximately $100,000.00 annually. Free of debt. Foundry building with office on street. Hard iron castings. Orders on hand. Located on spur track. Price $48,000.00 plus inventory. Address: Box 592, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED

Late model electric furnace. Champion speed draw stripping machine. Address: ILLINOIS FOUNDRY COMPANY, SPRINGFIELD, ILL.

Classified Advertising

Wanted-To-Buy

WANTED

Must be in first class condition, gas fired furnace for heat treating aluminum about 36" x 36" x 48" deep. Service combustion preferred. Address: BODINE PATTERN AND FOUNDRY CO., 1601 CASS AVE., ST. LOUIS, MO.

WANTED

Complete laboratory equipment for determination of carbon, silicon and manganese. Address: Box 588, The FOUNDRY, Cleveland 13, Ohio.

WANTED

1—Used No. 601 Osborn jolt rollover pattern draw molding machine. Address: ST. JEROME INDUSTRIES LTD., ST. JEROME, CO. TERRABONNE, PROV. QUEBEC, CANADA.

DRAINAGE FITTING PATTERNS

Production patterns and core blowing equipment needed to complete short line of drainage fittings. Describe available equipment completely. Address: Box 593, The FOUNDRY, Cleveland 13, Ohio.

WANTED

American sandcutter—electric powered—3 phase, 60 cycle, 220 volts, 60" or longer cutting cylinder. Address: Box 587, The FOUNDRY, Cleveland 13, Ohio.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

FATTERNSHOP

Interested in buying patternshop or part interest. Experienced patternmaker in wood and metal, matchplate and precision casting. Can make shop pay profit. Address: Box 472, The FOUNDRY, Cleveland 13, Ohio.

WANTED

One Beardsley & Piper stationary sandslinger with or without plate feeder—19" head. Advise age, price and full particulars. Address: Box 584, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR IMMEDIATE SALE

VIBRATING SCREEN — Tyler-Niagara Type #300. Serial #8733". Size—72" x 48". V-belted motor drive. Complete with gear reducers, sheaves, and Jeffrey Belt Conveyor Bucket Type Elevator.

JOLT SQUEEZE PATTERN DRAW MOLDING MACHINES—Johnson & Jennings. NEW IN 1943. Table size—15" x 21". Head Platen size—12" x 8".

HAND ROLLOVER POWER DRAW MOLDING MACHINE—SPO. Complete with run out car. Size inside frame—22½" x 72".

#6T Ransome Tailstock, 16,000# capacity. Faceplate size 53" x 53". Distance floor to spindle center—49". Two available—like new.

VENTILATING FANS, 36" floor and wall models, 220 volts.

7—Milwaukee #143-9 jolt squeeze strip machines. NEW in 1944. Stationary type. 14" diameter squeezing piston, 8" jolting piston diameter. Squeezing stroke—11". EXCELLENT CONDITION—IMMEDIATE SHIPMENT.

1—Davenport #24-SA rollover machine.

FALK MILL SUPPLY CO., INC.
18 WARD ST.
ROCHESTER 5, N. Y.
PHONE—HAMILTON 8745

For Sale

LIQUIDATING IRON FOUNDRY OF RICHMOND RADIATOR CO.

(BALANCE OF COMPANIE'S ACTIVITIES NOT AFFECTED)

500 Ton Sand Silo, Elevator.
New Sand Conditioning equipment with Speedmuller mill, etc. 40 ton per Hr.
Coleman Tower Core Oven 84" x 25".
Mayer Tower Core Oven 60" x 24".
Moulding Machines—jolt—squeeze.
Spencer cupola blower—9000 C.F.M.
Cupolas—Hoists—Cranes.
Molding Units—Turntables, etc.
Conveyors—Elevators—Screens.
125 V.M.G. Set—Compressor.
Machine & Carpenter Shop Tools.
Pangborn Rotoblast.
Pangborn Sand Blast.
Grinders, Mixers—Truck—Flasks.
Core Racks—Buggies, etc.

Come Directly to Foundry at Uniontown, Pa.

or Wire, Write or Phone

HETZ CONSTRUCTION CO., WARREN, OHIO

LIQUIDATORS **PHONE—NILES, O. 2-2509**

FOR SALE

CUPOLA CHARGER

2 ton P & H monorail unit, cab operated, 30' lift, 2 motors 3-60-220-440. This outfit complete with charging bucket and 79' of all steel crane way.

UNIVERSAL ENTERPRISES, INC.

P.O. BOX 5033 PHONE Y 1894 TAMPA, FLA.

FOR SALE

10—Osborn Sq. Molding Machines
16 x 20 Table, 15" Squeeze Cylinder Head swings clear of table
1—Dust Hood & Skip Hoist for Beardsley and Piper #60 Speedmuller
1—50 Ton W & W. Hyd. Bulldozer
1—36 x 86 x 36 Diamond Face Grinder
1—4' x 5' Heavy Duty Flotex Shakeout
6—30" x 40"—2000 lb. Cap. Flotex Shakeouts
Several 5" Adams Wood Slip Flasks—And Grey Iron Jackets
Various Sizes
All of the above very little used
1—O. & S. Locomotive Crane

THE OLIVER CORPORATION
533 S. CHAPIN
SOUTH BEND, INDIANA

MEXITE

Overstocked and will sell at sacrifice.
THE MILLER FOUNDRY COMPANY

740 JENKINS AVENUE
COLUMBUS, OHIO

FOR SALE

2 Sly tumbling mills, size 28 diameter x 38½ long. Allis Chalmers geared motor drive. Address: PERU FOUNDRY CO., PERU, INDIANA.

FOR SALE

Foundry Equipment of all kinds and all makes too numerous to mention. Please write for particulars.

HAYNES FOUNDRY EQUIPMENT
814 ADA ST. KALAMAZOO 52, MICH.

FOR SALE

ELECTRIC MELTING FURNACE

TOP CHARGE 9 FT. DIAM. SHELL, WITH 2500 KVA TRANSFORMER. VERY LITTLE USED, IN GOOD CONDITION.

FRANK B. FOSTER, INC.
2217 OLIVER BLDG. PITTSBURGH 22, PA.

FOR SALE

Two (2) side door charge Heroult electric arc furnaces including shell, roof, mast, winch motor assembly, electrode assembly, tilting mechanism, tilt control panel stand, one GE furnace control panel, one set flexible secondary leads. No transformers.

One (1) Ajax 50 pound induction furnace, complete with control panel and required capacitors. No motor-generator nor bus bars are included. In excellent condition.

BOX 416
THE FOUNDRY CLEVELAND 13, OHIO

Classified Advertising

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
3—75J Osborn Jolt Squeeze.
2—SPO #611-B Stationary, Oscillating, Jolt, Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table
4—Osborn #36 core box drawing machines.

BLOWERS FOR CUPOLAS AND FURNACES
2—Spencer Turbine Cupola blowers 4100 CFM 16-oz, 25 HP direct connected motor
Maxon-Premix Blowers for Gas, ¼ to 1 H.P.
METAL MELTING EQUIPMENT
1—Hausfeld 2000# Aluminum Capacity Furnaces. Barrel Type, Open Flame, Oil Fired
2—Monarch-Rockwell Rotating, 500# Brass, Oil New 32" to 41" Dia. Shell Cupolas made to order.
1—Buckeye #150 crucible tilting furnace, with premix blower for gas fire

TUMBLING MILLS AND SAND BLAST
1—Pangborn style GJ-1 rotoblast barrel, complete with Pangborn style FM automatic loader. Load capacity approximately 16 cu ft.
1—Pangborn No. 2 GH direct pressure type sandblast barrels, motor driven. Complete units.
1—Pangborn LE 6 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn LE 4 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn Sand Blast Unit including generating tank, shot cleaner, bucket elevator. Suitable for use with room.
1—Pangborn type EN-2 sand blast cabinet, suction type, 5 x 3 x 7 high.

MISCELLANEOUS
1—Gardner-Denver air compressor complete with 5 HP 3/60/220 motor and controls.
4—Heavy duty flexible shaft grinders 2 HP.
1—Heavy Duty Back Geared Sprue Cutter, 1⅛" square knives, T & L Pulley Drive.
1—Fay & Egan 14" blade revolving, double arbor, tilting table, variety saw with roller table.
1—Young Bros. Co. tower core oven, 5' x 1' shelves, gas fired, complete with Foxboro Control.
1—Young Bros. Co. batch type recirculating hot air gas fired core oven, 5' x 6' door opening, 9' deep.
3—Foundry Equipment Co. sliding shelf core ovens with five 30 x 42" shelves, 8" high. Gas Fired.
1—Lampson Endless Mold Conveyor 100' long x 16' wide, with 19 x 26" pallets, 36 inches on centers.
2—Warner material elevators 1000# capacity, 20' lift, 2' x 2' two tier cab.

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

FOUNDRY EQUIPMENT

1—Osborn Core Blower, No. 193
1—Demmler Core Blower, Style 3-E
1—Osborne Core Box Drawing Machine #146
Molding Machines—Herman R.O. 1500 lb. cap.
International 24" x 30" Type G
Osborne Jolt Squeezers, various sizes
3—2-ton Ingersoll Air Hoists

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO., NOT INC.
767 MILWAUKEE AVE. CHICAGO 22, ILL.
PHONE: CANAL 6-0314

FOR SALE

Air compressor—new and used up to 100 HP
Pangborn roto blast, 6 ft. table with dust collector and all electrical equipment.
Tumblast—air operated dust suppression tanks.

JOE VEVERKA
1020 BROOKPARK RD. CLEVELAND 9, OHIO
OFFICE PHONE—FLORIDA 2641
HOME PHONE—FLORIDA 1035

For Sale

LATE MODEL EQUIPMENT AT LESS THAN HALF PRICE

36" x 42" American Wheelabrator—1943
20" x 27" American Wheelabrator—Tumblast
#45 American Dust Collector
#602 Osborn Molding Machine—1943
300 Amp. G.E. A.C. Arc Welders $125.00

BALCHER MACHINERY SALES
1884 S. COMPTON ROAD
CLEVELAND HEIGHTS 18, OHIO

FOR SALE

WHITING GANTRY CRANE, 100' Span, 7½ tons capacity, 20' extension, 41' lift, 3 motor D.C. drive, new 1942.

Write — Wire — Phone

INDUSTRIAL PLANTS CORPORATION
90 W. BROADWAY NEW YORK, N. Y.
(BARCLAY 7-4185)

FOR SALE

2 Tumbling barrels with motors, one 12' long x 48" dia. and one 6' long x 36". Address: THUNDER BAY MFG. CORP., ALPENA, MICHIGAN—PHONE 834.

FOR SALE

TURBO BLOWERS (3 Phase, 60 Cycle)

cfm	Pressure	Make	Motor H.P.	Volts	Speed
3500	40 oz.	Spencer	60	440	1800
2200	40 oz.	Spencer	40	220/440	3600
1380	16 oz.	Nth. Amer.	10	440	1800
1050	32 oz.	Spencer	15	550	3500
900	24	Spencer	15	220/440	1800
650	32	Spencer	10	220/440	3600
225	10	Spencer	1	220/440	3600
150	3 lbs.	Spencer	5	220/440	3600

PRESSURE BLOWERS (3 Phase, 60 Cycle)

2500	7 oz.	Sturtevant	15	220/440	1800
2400	14 oz.	Mahr	15	220/440	3480
1400	8 oz.	Robinson	5	220/440	3600
1150	20 oz.	Nth. Amer.	10	220/440	3600
950	16 oz.	Nth. Amer.	7½	220/440	3600
660	20 oz.	A & B	7½	440	3600
550	20 oz.	A & B	5	440	3600
450	6 lbs.	A & B	30	220/440	3450
340	20 oz.	A & B	3	440	3600
250	12 oz.	Gen. Elec.	2	220/440	3600
150	12 oz.	Nth. Amer.	1	220	3600
150		McKee	1	440	3600

MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND, OHIO
FOR SALE

FOR SALE

AJAX INDUCTION MELTING EQUIPMENT

1—Motor-Generator set, 200 KW 800 volts 960 cycle G.E. Generator direct connected to G.E. motor, 300 HP 4160 volts 3 phase 60 cycle.

1—Motor starter

1—Generator control panel

1—Furnace control panel

1—300# furnace and necessary capacitors.

This equipment is in very good condition, purchased new in 1940. Taken out of operation only because larger capacity had to be obtained. Price $20,000.00.

For inspection write:

THE INDIANA STEEL PRODUCTS CO.
VALPARAISO, INDIANA

For Sale

FOR SALE

2—17" x 17" slip flasks.
2—12" x 16" slip flasks.
2—14" x 14" Sterling steel flasks.
6—12" x 14" Sterling steel flasks.
7—12" x 12" Sterling steel flasks.
12—10" x 15" Sterling steel flasks.
4—Hand Air Grinders.
10—Hand Air Hammers.
2—Master Floor Rammers.
1—Small lathe 8" swing, 48" centers.
1—28" Dia. band saw.
1—Floor ¼ to 1½-inch drill press.
4—Budgit Hoists 1 ton capacity.
17—Sand riddles, 18" Diameter.
1—5-ton worm geared ladle.
1—3-ton worm geared ladle.
9—65 lb. ladles with loose handles.
3—4½" vises.
4—4" vises.
700 lineal feet of monorail and 3 trolleys.
6—Double grinders on steel benches with switches and motors.
8 fire extinguishers.
16 switch boxes with 3-way plug-ins.
3—High capacity fuse boxes.
3—Low capacity fuse boxes.
4—Small capacity fuse boxes.
2—500 lb. Chain Blocks.
1500 lb. Chain Blocks.
500' ¾-inch Air hose, random lengths.
Tools, pinch bars, chains, etc.
1—Bucyrus Erie Crane Type G.A.2, #4412. Date of manufacture 11/7/27. 55 foot boom, Waukesha gasoline motor. Air controlled operation. Large air compressor. Enclosed cab and boom cables. Weight, approx. 40 ton. Caterpillars in good condition. Motor recently overhauled. Radiator does not leak. Extra drive chain and parts.
1—Westinghouse 3 Y.C.H. 16 Air compressor #186860, serial #171663. Air pressure to 175 P.S.I. 5 H.P. Motor, 220 volts, A.C., 3 Phase, 60 cycle. Capacity 25 C.F.M. Motor mounted on tank. V belt drive.
1—Curtis air compressor, tank mounted. 13—C.F.M. capacity. 5—H.P. motor, 220 volts, A.C., 60 cycles, 3 phase. V belt drive.
1—Ingersoll-Rand E.R.1 compressor #20635. Capacity 450 C.F.M. Air tank 3 feet x 8 feet. Cylinder 14" x 10". 75 H.P. motor and starter, 220 volts, A.C., 3 phase, 60 cycle. V belt drive 4 belts. 2 safety valves and oilers, all piping to tank 6" dia. Gauge, air filter and extra crank shaft bearings.
1—28 C.F. per revolution Roots Connersville Blower, with 50 H.P. motor, 220 volts, 3 phase, 60 cycle and V belt drive, and starter.
1—33 C.F. per revolution Roots Connersville Blower, without motor, starter or V belt drive.
1—Osborn jolt Squeezer Moulding Machine.
1—Adams jolt Squeezer Moulding Machine.
1—Tabor squeezer Moulding Machine.
1—300 Amp. Wilson Welding Machine.

Best price offered for any article will be considered

HARTLAND STEEL & FOUNDRY
CARBON ST., WEATHERLY, PA.

NEVER USED—WILL SACRIFICE

One molding machine #559 jolt stripper made by Osborn Mfg. Co. One molding machine #442 jolt rockover pattern draw made by Osborn Mfg. Co.

THE ENTERPRISE MFG. CO. OF PA.
3rd & DAUPHIN STREETS
PHILADELPHIA 33, PA.

FOR SALE

2—Detroit Electric arc melting furnaces. Complete with transformer and accessories.

Write for details.

CONTINENTAL MINERAL PROCESSING CORP.
1413 TRACTION BLDG. CINCINNATI 2, OHIO

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words, $2.00. Additional words 7c each.

ALL OTHERS—"Help Wanted"—"For. Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $4.00. Additional words 12c each.

NOTE—If replies are to be sent to a box number in care of THE FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 12.00	$11.00	$10.00	$ 9.00
2 inches	21.75	20.00	18.25	16.75
3 inches	32.00	29.25	26.75	24.00
4 inches	40.00	36.75	33.25	30.00
5 inches, ½ col.	48.00	44.00	40.00	36.00
6 inches	58.75	53.25	48.00	42.75
7 inches	66.00	60.00	54.00	48.00
8 inches	73.25	66.75	60.00	53.25
10 inches, 1 col..	88.00	80.00	72.00	64.00
Half Page	130.00	120.00	110.00	100.00
Full Page	220.00	200.00	180.00	160.00

Remittance should accompany advertisement when submitted—Cash Discount 2%, 10 days.

THE FOUNDRY

Penton Building, Cleveland 13, Ohio

NEW "How-To-Do-It" Books for Foundrymen . . .

● Here are books every foundryman will want to add to his technical library. These are not elementary texts, but important working "tools" for everyday reference by everyone in your organization from apprentice to engineer. Every book in filled with plain, practical, common-sense information you can put to immediate use to help cut costs right in your own plant. Use the convenient coupon below to order your copies today.

Analysis of Casting Defects

To help foundrymen minimize and eliminate defective castings. Thirty-one basic casting defects listed and described. ..... *Price, $4.25*

An Introduction to Metallurgy

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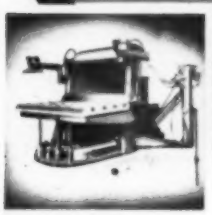

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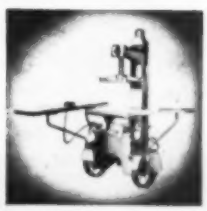

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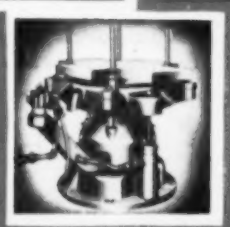

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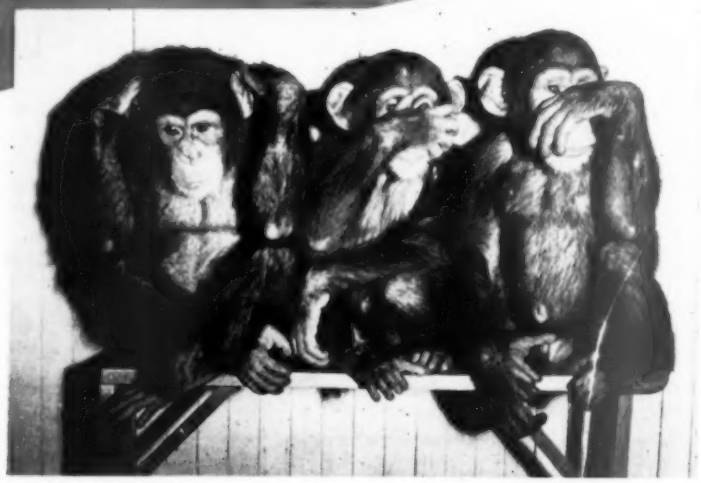

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Names and Addresses of All Foundries

Type and Number of Melting Units

Capacity of Melting Units

Type of Metal Melted

Departments Operated

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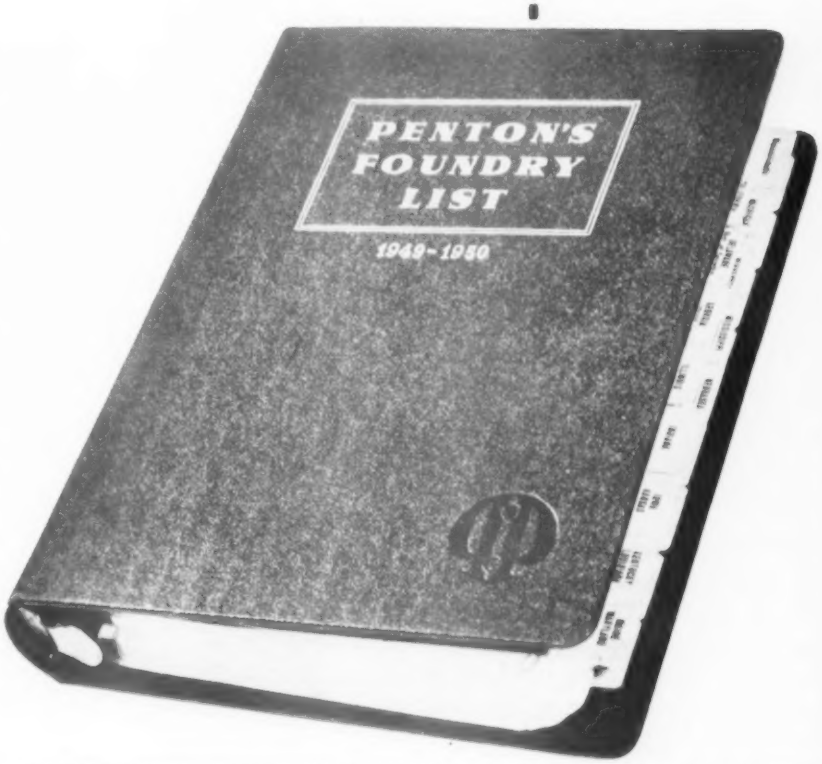

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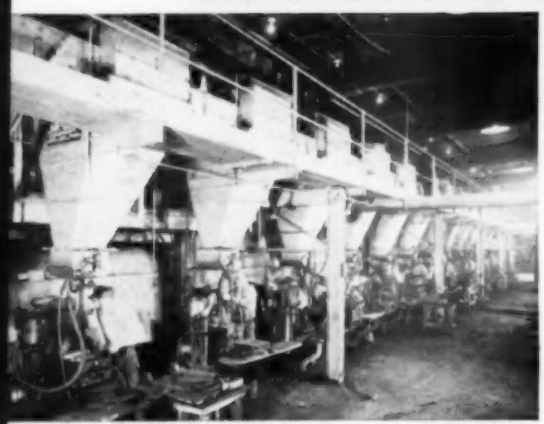
Link-Belt "PA," Positive-Action Oscillating Conveyor in tunnel under floor of mechanized malleable iron foundry, delivering hot sand and castings to Link-Belt No-Leak overlapping steel apron conveyor for transfer to shakeout screen.

Right: General view of sand handling and preparation unit showing shakeout, elevator and old and new sand storage bins feeding to mixer.



Line of 14 molding stations, with overhead sand hoppers served by distributing belt conveyor.

Pouring zone of mold conveyor, showing three men pouring hot metal into molds which then pass through the ventilated enclosure around to other side of conveyor.

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